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Amdahl Corp. 470V/6

Amdahl Ends Silent Years With Unveiling of 470V/6

By Patrick Ward
Of the CW Staff

SUNNYVALE, Calif. – Amdahl Corp. broke years of silence last week when it introduced a general-purpose computer that it described as software- and hardware-compatible with the IBM 370/168, but about 100% faster.

In addition, the firm announced two sources of lease financing for the system, designated the 470V/6.

The formal unveiling of the 470V/6 marked the first product announcement from the firm that Gene M. Amdahl, former IBM Fellow and manager of architecture for the System 360, founded five years ago.

Fujitsu, which has given Amdahl both technical and financial support (see related story on Page 35), is building the 470V/6 in Japan and will market it in much of the world.

Amdahl Corp. does not intend to build smaller CPUs, nor does it "have any immediate plans to . . . sell peripherals or to challenge the de facto standard of IBM software," according to Eugene R. White, Amdahl president.

While the 470V/6 and 370/168 share "logically similar" internal architectures, he described the 470 as a "fourth-generation" computer because it uses Large-Scale Integration (LSI) circuitry rather than the small-scale integration circuitry found on a 370/168.

The higher LSI packing density (50- to 100 circuit/chip vs. 5 circuit/chip on the 168) cuts wire travel time loss. This is the principal reason why the 470V/6 offers a 32.5 nsec cycle time compared with the 168's 80 nsec cycle time, the company said.

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Nuclear Plant Licensing Based on Dubious Data?

By John Hebert
Of the CW Staff

CAMBRIDGE, Mass. – There may be serious errors in official computer predictions used to license large-scale nuclear power plants, Carl J. Hocevar, an engineer with the Union of Concerned Scientists (UCS) here, said recently.

Experimental tests performed in May and August at Aerojet Nuclear Co.'s Idaho National Engineering Laboratory (Inel) raised new doubts about the safety of large nuclear reactors, Hocevar said.

The Inel tests underscored Hocevar's conviction "that the government has misrepresented the adequacy of its computer predictions of nuclear plant safety," he said.

The main thrust of Hocevar's allegations are found in a recently published study he authored entitled "Nuclear Reactor Licensing – A Critique of the Computer Safety Prediction Methods."

"In August 1974 the Atomic Energy Commission released a draft of a Reactor Safety Study (RSS) which was undertaken to assess the risks of accidents in commercial nuclear power plants," the report stated.

"There are serious questions as to the validity of the methodology employed by the RSS group to identify all possible accidents and quantify the probabilities of serious accidents," it continued.

"Adequate amounts of appropriate data do not yet exist for current-generation reactors since the commercial operating experience for large power reactors is very limited," the report stated.

Simulation Used

Computer simulation models are central to the issue of reactor licensing, Hocevar said.

The models depict the controllability of plant accidents by verifying the quality and adequacy of emergency core-cooling systems (ECCS), he said.

The models at present are used exclusively to determine plant safety – a substitute for testing these emergency back-up cooling systems under actual accident conditions, he explained.

The Nuclear Regulatory Commission (NRC) supplies mathematical descriptions, which are used to develop computer codes depicting the performance of

(Continued on Page 2)

Could Lead to Mail Strike

DP-Based Postal Plan Nears Showdown

By Patrick Ward
Of the CW Staff

PORTLAND, Ore. – The U.S. Postal Service and the National Association of Letter Carriers (Nalc) are moving toward a showdown over a computerized work-measurement system called the Kokomo plan [CW, FEb. 12].

The Postal Service had planned to put the plan into operation in Portland's Rose City Station after seven months of tests. Now, however, the decision on whether to implement it will be made by a board of arbitration which will begin study of the issue on Nov. 19.

If the arbiters decide in favor of the Postal Service, there is some danger of a strike, Nalc President James E. Rademacher said.

The Kokomo plan, named for one of its test sites, "is a method of evaluating work in order to get every route as close as possible to an eight-hour day," a Postal Service spokesman said.

The plan involves measuring the volume of mail, distances, terrain and the number of steps, boxes and other factors in a particular mail-delivery area.

The Postal Service then keypunches the data for a computer system which lists the work value of that particular area. Local postal supervisors can use the results to plan routes that take neither more nor less than eight hours to complete, the Postal Service spokesman said.

"I think it will generally show the need for fewer letter carriers if implemented nationwide," the spokesman added.

The Rose City test has been successful, he said. The station had 41 full-time and three part-time carriers compared with the current 38 full-time and one part-time carriers, he said.

However, rising overtime at the station more than makes up for the people who have been transferred out, Rademacher said.

Half of the newly designed routes now take nine- to 10 hours a day, he said. The employees have protested, but the Postal Service "is sticking to that system to the bitter end," the Nalc president said.

"Morale is terrible. I had to go out there last week to avoid a strike," he said.

Half of the employees have transferred out of the Rose City Station since the Kokomo plan testing began. The other half want to get out, Rademacher said.

"We haven't found anything to indicate that people are bidding off the routes," the Postal Service spokesman said. He also denied overtime is significantly higher than before.

Elsewhere in the U.S., postal supervisors evaluate a route by going around it with the letter carrier once a year.

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DP Investment Focus Of Next Year's Forum

NEWTON, Mass. – The Computer Users' Forum for 1976 will focus on "Optimizing the Data Processing Investment," according to the program's organizers.

The forum, which is the management education portion of the Computer Caravan, will comprise a half-day's activities on each of three days in the nine 1976 cities.

The second portion of the day will be devoted to exhibitor-sponsored seminars, and an exhibition will run concurrently with all these sessions.

As a result of feedback from previous years' attendees, several new topics have been added to the forum program, Edward J. Bride, forum director, noted.

The new topics include audit software

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CDC Winchester-Type Modules Priced 25% Less Than IBM Units

By Nancy French
Of the CW Staff

MINNEAPOLIS – IBM users considering a shift to Winchester-type data modules will soon have an alternate source at 25% below the purchase price of IBM's 3340s.

The CDC 33401 and 33441 disk modules, offered by Control Data Corp. to the OEM market last May, will be made available to end users in the second half of 1976, the company said.

In addition to a purchase arrangement, CDC will offer the modules on a monthly lease basis, including maintenance, at about 15% less than IBM's Extended Term Plan, the company said.

Like the Winchester, both drives use sealed canisters to store from 35M to 280M bytes of data that are read by moving heads contained in the module.

In addition, module options offer either .5M or 1M bytes of fixed-head, zero seek time data per module for tasks such as job queues or indexes that require high-speed data access.

Both CDC drives operate with the company's 38302 storage controller as well as the IBM 3830-2 controller and Integrated Storage Control (ISC) for the IBM 370/145, 158 and 168 CPUs.

The 38302 controller also permits users to connect the 33401 and 33441 drives to the CDC 38500 mass storage system announced and demonstrated in May.

The CDC 33401 device uses any of three removable data modules available as 35M- and 70M-byte moving-head models and a 70M-byte version with .5M bytes of

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Basis for Licensing Reactors Questioned

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the ECCS, to independent testing facilities such as Inel, Hocevar explained.

Two types of codes are developed from the descriptions, he said.

The first computer code incorporates assumptions concerning the highly complex and interacting factors involved in an accident of the ECCS. This code, known as the evaluation model, is used as a basis for reactor licensing, he said.

A second computer code is a nonassumptive model called the best estimate code, which is used as a partial basis for the evaluation model, he continued.

"The government has not changed the first set of codes, which is the crucial one," he stressed.

NRC did modify the mathematical descriptions used in the best estimate model after the operating temperature was found to be 250° F higher than was estimated, Dr. Herbert Kouts, director of the Office of Nuclear Regulatory Research of NRC, said.

As the best estimate codes are tested and improved, it leads to the improvement of the evaluation model codes, Kouts said.

The tests are run to determine the degree of conservatism in the best estimate computer codes. A greater degree of conservatism is built into the evaluation model codes, Kouts said.

"There has been no modification resulting from the recent Inel tests. We feel we understand that part of the descriptions," Kouts explained.

Although test results have been the same during the accident phase now that the temperature modifications have been made to the best estimate code, Hocevar's study results and government results continue to differ in depicting normal reactor operation, Hocevar said.

"It would take a big nuclear reactor accident for the government to change the code standards it sets on evaluation models used in the licensing process," he said.

"Nobody really knows at this time how frequently accidents in nuclear reactors will occur.

"There will be 1,000 reactors in this country by the turn of the century if industry and the President get their way," he said.

Data Bases Needed

"Large data bases are needed from which to draw information. We need to know what the failure rates will be on all major safety systems components in large nuclear reactors," Hocevar said.

"They do not now exist, nor does anything like them," he said.

"The government has invested a hell of a lot of money in nuclear reactors, and careers are at stake, and maybe we've gone too fast with it," he said, explaining the reluctance to modify the computer codes.

"We've put the cart before the horse" by building and then testing, according to Hocevar, who worked at Inel for seven years developing the computer prediction methods used by the government in nuclear plan licensing.

"There's a lot we could do to make the reactors safer than they are now," he concluded.

'Optimizing DP Investment' Set As '76 Caravan Forum Theme

(Continued from Page 1)

and data security, distributed processing, evaluation of service bureaus as alternatives to in-house systems and career pathing as a management aid, he said.

As in the past, the general format for the forum will be case-study presentations by local end users and consultants. In each city, computer users and consultants will relate how they solved a particular problem or implemented a software package or piece of equipment, Bride explained.

This year's schedule calls for all four workshops to be conducted before lunch; the workshops will be repeated so more than one workshop can be attended each day.

The 1976 Caravan will again feature a wrap-up panel following the workshops, but this session will also be held before lunch so attendees can spend the entire afternoon visiting the exhibits and attending exhibitor seminars.

Under an overall theme of "Management Overview," the opening-day workshops will focus on problems by installation size.

The use of an in-house computer vs. service bureaus for small organizations will be the focal point of one workshop, while developing career paths for programmers and operators in medium- to large-size installations will be the topic of another.

Other first-day workshops will look at minicomputer projections for the rest of the '70s and equipment and financing alternatives, including independent peripherals and third-party mixed systems.

Software will be the center of attention on the middle day in each city, specifically "protecting and controlling your DP investment through software," Bride said.

Workshop topics for the second day will include audit software and other aspects of data security, data base management packages and software as a measurement tool.

The final day's sessions will concentrate on computer networks for business and administrative users.

The Computer Caravan, which is sponsored by Computerworld, Inc., will open in Boston March 2-4. From there it will travel to New York, Washington, D.C., Atlanta, Detroit, Chicago, Dallas, Los Angeles and San Francisco.

Postal System Facing Showdown

(Continued from Page 1)

"There is no specific standard in the field today. The route assignment is determined by the individual's endurance," Rademacher said.

This makes more sense than expecting a young, 6 ft 3 in. letter carrier and a much shorter, older or less robust person to work the same kind of route, he said.

"Under the plan these factors don't come into consideration; everyone is to assume the same pace," he said.

Part-Time Help

The Postal Service said it plans to assign part-time help to carriers who, for one reason or another, need it to complete their routes.

The Kokomo plan would save the Postal Service the time and expense of having its supervisors walk the carriers' routes once a year, the spokesman said.

And it would allow local supervisors to use hard data in judging routes, rather than working from the subjective impression of what a route looked like on a particular day, the Postal Service spokesman said.

If a new apartment building changes the work value of a particular area, the Postal Service could just update its data base to reflect the change in that area's work value, he said.

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Amdahl 370/168-Compatible CPU Said to Be About 100% Faster

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The LSI circuitry also promotes reliability and reduces bulk so a fully installed Amdahl 470V/6 system is one-third the size of a 168, the company added.

Beyond the circuitry differences, the 470V/6's approach to cache memories, overlapped execution and multiplicity of instructions differs from other large CPUs, Amdahl said.

The 470V/6 comes with 16 standard channels in any combination of byte, block or selector, compared with 12 channels available on the 168, Amdahl said.

The Amdahl machine also differs from the 168 in that it is air-cooled and does not require water chillers or plumbing.

Amdahl Strategy

Amdahl's strategy is to offer IBM 360/370 users a cost/performance advantage while preserving the user's software investment, White said.

The compatibility is such "that in any situation where an IBM 370 or 360 is running any set of programs, using any peripheral mix, the 470V/6 can be substituted with no more changes than the user would have to make in moving from one 370 model to another," the company said.

The company may or may not deviate from the path of compatibility when IBM announces its Future Systems.

"It depends on whether we think we can do something better and we'll make that decision then," he said.

Amdahl has currently delivered machines to a National Aeronautics and Space Administration (Nasa) site in New York City, the University of Michigan [CW, Oct. 15] and to Texas A&M University.

The 470V/6 at the Nasa site was in full operation five days after delivery, the Michigan system was running programs 33 hours after delivery and the Texas A&M machine was turned over for production use in 14 hours, Amdahl said.

The 470V/6 at Nasa passed that agency's 30-day acceptance test with 99% uptime, White added.

Field service for current and future Amdahl users will be local and on-site, White said.

The company is also offering the services of the Amdahl Diagnostic Assistance Center (Amdac), which operates out of the company's headquarters here. Amdahl mainframes utilize a minicomputer-based operator console, and Amdac allows local technicians to hand over control of the 470V/6 to technicians at the Amdac minicomputer.

Those technicians can then test about 16,000 operating points remotely, Amdahl said.

The 470V/6 sells for between $3.7 million and $6 million. DPF, Inc. has provided Amdahl with $160 million in lease financing for commercial customers and Municipal Leasing Corp. of Denver plans to provide $20 million in lease financing for state and local government and state university contracts, Amdahl said.

Amdahl is at 1250 E. Arques Ave., 94086.

Amdahl Bullish on Big Machines

SUNNYVALE, Calif. – With IBM's Future Systems (FS) looming and minicomputers infiltrating every corner, this may not seem like a very auspicious time to introduce a large computer.

But Gene M. Amdahl, founder of the company that bears his name, feels FS is far enough off to leave space for his company's entry, the 470V/6.

"Even after FS comes out, there will be time before users want to convert to it," he said.

Amdahl is also "very confident about large machines" despite challenges from minicomputer and microcomputer technology.

He pointed to the large size of the corporations involved in transaction processing. "Their data bases normally require sequential integrity. They have to have a central data base, and the transactions have to be fast enough to maintain that sequential integrity."

In other words if Message A empties an inventory, Message B must not carry back word that the product is still available.

Minicomputers in a ring configuration are no faster than their slowest link, Amdahl said, and would not be as adept in handling a sequential series of instructions as a large mainframe.

Minicomputers fit into the picture by providing a local, human-scale DP source, he said, with a large machine as the central source of information.

CDC Modules to Cost 25% Less Than IBM

(Continued from Page 1)

fixed-head capacity, CDC said.

This fixed-head approach allows fast access to data with no time delay because of head positioning motion.

Each 33401 holds two modules and operates with a pair of drive motors, two sets of load/unload controls and two voice coil motors and servo control circuits.

The capacity of a 33401 subsystem with a single 38302 controller ranges from 70M to 2.24G bytes of data.

The CDC data modules are fully interchangeable with IBM 3348 units and include disks, access arms and read/write heads in a single cartridge, the company said.

Since the head recording data on a disk is always the same one that reads the information back to the computer, it eliminates misalignment of the heads and tracks.

CDC said the data module drive provides a major advantage over the IBM 3350 and 3344 fixed-head drives since the module can be moved to another drive in case of failure.

The 33441 has a capacity of 280M data bytes with 1M byte of fixed-head, zero seek time capacity optional.

Both modules can be used with Virtual Storage IBM 370/135 through 168 systems under the control of OS/VS1 and VS2 and VM/370.

The drives are also supported by DOS/VS.

Edelstein Returns IBM Papers Asking End to Gag Rule

By Edith Holmes
Of the CW Staff

NEW YORK – Judge David N. Edelstein recently returned IBM's papers asking an end to the gag rule in the government's antitrust suit against the corporation [CW, Oct. 22].

Explaining IBM counsel had failed to file the papers requesting he vacate Pretrial Order 4 in accordance with his procedures for filing motions in this trial, Edelstein said the defense could correct its errors and resubmit its motion.

IBM had attached two third-party documents currently under an order protecting their confidentiality to the exhibits supporting its memo on the gag rule. Attorneys for IBM had ommitted a cover letter alerting the judge to the existence of this confidential material – an omission which could have resulted in the filing of private matters in the public file by accident, the judge said.

IBM has asked that Pretrial Order 4, which prevents the parties and their witnesses in this trial from discussing the case openly with the press and public, be revoked on three grounds.

First, it is an unconstitutional violation of the first amendment, particularly as a result of a precedent set by the decision of a case, CBS vs. Young, in the Sixth Circuit Court of Appeals this summer.

In addition, the defense said the order has been taken by the government and Judge Edelstein to mean IBM cannot communicate about this case with its shareholders and employees or respond to "false and unfounded" media statements.

Finally, Pretrial Order 4 is unfair to IBM because, while the corporation is barred from talking about the suit, the government's "consultants," the so-called Computer Industry Association, or CIA, have engaged in a massive propaganda compaign in the press and elsewhere against IBM, the defense papers stated.

CIA Files Cited

Attorneys for IBM cited recent discovery of CIA files as the source of much of their information.

Based on what they found in those files, IBM counsel concluded the association has acted in the capacity of consultant to the Justice Department and has used information gained in a private conference with Edelstein to launch a propaganda campaign designed to minimize the public notion that IBM stockholders would suffer from a breakup of the corporation.

Attachments to the IBM memo include various letters and communications between the CIA, its members and the Department of Justice, examples of what IBM considers "scandalous and false accusations in the press" and the notes of the conversation with Edelstein which allegedly took place on Nov. 13, 1972.

In those notes, the CIA commented it "would not wish IBM to be able to make concern for its shareholders the central gut concern of Judge Edelstein when relief is formulated."

The CIA member who talked with the judge felt he "could not state personal or CIA concerns regarding the merits of the case in a closed session," the notes said.

They then detailed Edelstein's desire to move the trial along as expeditiously as possible and his recognition that the case is perhaps "the most important antitrust case ever."

In contrast to the 15-page IBM memo with lengthy affidavits by both lead IBM counsel Thomas D. Barr and head corporation counsel Nicholas Katzenbach, the government's response memo was a brief two pages.

"Pretrial Order 4 reflects the court's concern that this already complex litigation not be complicated further by disputes over public statements by the parties and their attorneys, the government said. "In short, this court has indicated its desire to have the case tried in the courtroom, rather than in the press."

Attorneys with the Justice Department noted the order was adopted at the request of IBM and that it has "helped to limit the distraction of extrajudicial comment between the parties and their counsel in this suit." "Until now, IBM has not questioned the constitutionality of the order," the government memo added.

However, if the order is revoked for IBM, the Justice Department asked that it be vacated for the government as well. "The Department of Justice is responsible to the citizens of the U.S., just as IBM's management is responsible to its shareholders."

While the government's memo did not mention IBM charges of a connection between the Justice Department and the CIA, the lead government attorney Raymond M. Carlson told the judge the CIA had not been employed as a consultant during a recent "robing room" conference.

For its part, IBM noted it "does not seek to hold the plaintiff, its representatives or the CIA in contempt of Pretrial Order 4, although grounds for such a finding may be present."

No Tricks, One Treat

NEW YORK – Prior to last week's recess, rumor had it that – in addition to all the other holidays the court plans to observe this year – the judge hearing the U.S. government's antitrust suit against IBM intended to break for Halloween.

As usual, rumor was only partially correct. The court did recess for the week of Oct. 27 to permit Judge David N. Edelstein, the sole arbiter in the case, to attend a meeting of the Metropolitan Districts Chief Judges of Federal Courts.

Having engaged in numerous versions of "trick or treat" ever since the trial began last May, neither the government nor IBM needed a holiday for that purpose.

Perhaps the judge was afraid the parties would come to court that day disguised as each other – or worse yet, as themselves.

Terrorists Claim Responsibility for IBM Bombing

CHICAGO – One IBM Plaza here was among the nine government buildings, corporate offices and banks that experienced nearly simultaneous early-morning bomb explosions last week in New York and Washington, D.C. as well as Chicago.

As in all of the blasts, no one was injured at the IBM building when the bomb, placed outside on a plaza next to the windows of the lobby, exploded, a spokesman for the corporation said.

The explosion at approximately 1 a.m. (CST) did manage to shatter five windows, however.

IBM prepared no statement on the matter and turned the incident over to the Chicago police for investigation.

An underground terrorist group calling itself the Fuerzas Armadas de Liberacion Nacional Puertorriquena (FALN) or Armed Forces of National Liberation, claimed responsibility for the act. Statements by the organization indicate its members viewed the bombings as part of a "coordinated attack against Yanki government and monopoly capitalist institutions."

By the middle of last week, Chicago police reported they had made little progress in the case. Bomb experts believe the devices used here contained dynamite and were ignited by small propane gas tanks, a method used previously in this metropolitan area by the FALN.

DP Foul-Up Causes Issuance of Late Tax Notices

MARTINSBURG, W. Va. – An undetermined number of erroneous notices were sent to taxpayers recently because of a foul-up at the Internal Revenue Service (IRS) National Computer Center.

The notices assessed taxpayers for back taxes plus interest and late penalties on dividend income they allegedly didn't report in 1973.

The error was caused by the merging of magnetic tapes containing dividend information for certain companies for 1972 and 1973, so that dividends for both years were recorded as being dividends for the year 1973.

The merged tape, which is believed to involve only companies based in Tennessee, was sent to the Memphis Service Center. When the center compared its tape of tax returns for 1973 with the National Computer Center tape, it found apparent widespread underreporting of dividend income by individuals and started sending out notices.

The error was discovered late last month when complaints from corporations and individuals were received, but it is not yet known how or when the merge occurred.

The system is currently being checked out to discover exactly what happened, according to William E. Palmer, director of the National Computing Center.

The IRS also does not know exactly how many companies were involved or how many taxpayers were affected, although Palmer feels the incidences were "isolated."

However, other sources claimed at least eight companies were involved.

Correction

The captions under the photos of Dr. Gary Casper and Fred H. Harris were reversed [CW, Oct. 15, Page 10].

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Study by ABA Finds

DP Present in 92% of U.S. Banks, But Usage Varies

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Ninety-two percent of all U.S. banks use or are planning to use computer systems. However, although the use of DP may be nearly universal, the way it is used is not, according to a study by the American Bankers Association (ABA).

Nearly all of the largest banks and 78% of medium-sized banks have in-house equipment. The figure drops to 16% for small banks, Per Lange, director of ABA's Surveys and Statistics Division, and Arnold Kaplan, assistant director of the Operations and Automation Division, reported in the September issue of *Banking*.

The survey was mailed to all U.S. banks with more than $50 million in deposits. Responses were received from 1,657, representing more than 70% of the nation's total bank deposits, the authors noted.

Sixteen percent of mid-sized banks and slightly more than two-thirds of all banks use off-premises facilities, but "whether this will continue is a matter of speculation," they said.

"The minicomputer is just entering the picture and is already being chased by the new, smaller microcomputer," they added, although no details were provided to back this observation.

Automation on Upsurge

The authors found "remarkable" growth in automated services that are visible to the public. Only 4% of all banks offered cash-dispensing machines in 1972, they said, but "this year, 8% do and within a year 13% plan such a service.

"Three years ago, only 2% of banks had automated tellers or teller-assisting devices," they added on a slightly different but related topic. "Today 25% do and that percentage will increase to 27% by 1976."

Despite the "legal uncertainty" now surrounding off-premises electronic fund transfer operations, the survey showed banks expect growth in this type of bank service.

The interest in such services, as a means of extending operations to a larger geographic area, is "most pronounced" among small banks, Lange and Kaplan found.

Increasing Chunk of Expenses

DP accounts for an increasing share of a bank's total expenses and, in general, the larger the bank, the more it spends – relatively – on DP.

The cost of DP ranged from 8.4% of total expenses this year for the largest banks to 6.8% for smaller ones. The rate of increase for such expenses was greatest, however, among smaller banks, indicating their DP involvement – while lagging behind that of larger institutions – is now increasing more rapidly."

Heavy use of commercially available remote-computing network services indicated banks do not perform all automated tasks completely in-house, even if they have their own computers. Indeed, the percentages suggested the larger banks – which are more likely to have their own gear – are more likely to use the outside services as well.

In the banks' own operations, on-line processing is rapidly superceding batch processing in many areas, particularly installment credit, savings accounts, credit card operations and financial information systems, according to the survey.

"At present, about 80% of major automated bank operations are handled in a batch mode," the authors acknowledged, but "within a year, 45% of these operations are expected to be on-line."

Perhaps related to the move to on-line operations, most banks believe they will have to replace their present computer systems within the next three to five years.

"Only 21% believe their present systems will still be in use five years from now," the analysts found.

IBM Leading Vendor

IBM leads all other hardware manufacturers combined as a vendor to the banking industry. This reflected a preference among the larger banks, the survey showed, since Burroughs and NCR ranked first and second as suppliers to small banks.

The next three years should see a "substantial increase" in systems and programming needs, the ABA reported: 54% of small banks, 74% of mid-sized banks and 77% of the largest institutions anticipate growth in these areas.

Services visible to the bank customer may be dramatically different three years from now, the study showed. At-home telephone bill-paying service will be commonly available by 1978, according to 26% of the banks, and 20% saw some other sort of bank-at-home service.

Thirty-five percent expect an automated program for banking-at-work will be adopted on an industrywide basis by then.

Copies of the "Results of the 1975 Operations and Automation Survey" (publication number 0671) are available for $50 for ABA members and $100 for others from the ABA, 1120 Connecticut Ave N.W., 20036.

IT Returns to L.I. as Expanded EFTS

By Don Leavitt
Of the CW Staff

HEMPSTEAD, N.Y. – IT has come back to the north shore of Long Island.

The Instant Transaction point-of-sale electronic funds transfer system (EFTS), run experimentally by Hempstead Bank in 1971-72, has been reinstituted by the bank with new equipment and a broader scope of operations.

Participating in the starup of the new IT will be Hempstead Bank's 10,000 checking-account depositors and 35 varied retail merchants in six North Shore communities.

IT is based on an immediate transfer of funds from the customer's account to the merchant's account at the Hempstead Bank. Thus IT is neither a credit-card operation nor a check authorization process; the money is transferred right at the time of sale.

The merchants have Addressograph-Multigraph Amcat-1 terminals which are linked to the bank's Burroughs B3500. The units read a magnetically encoded stripe on the back of a customers' IT identification card.

Authority for the bearer to use the card is validated when he keys in a secret number on a numeric pad attached to the terminal. The number is compared to a number previously selected by the card owner and stored in enrypted form in the customer's file.

Copper Wire

The original IT test was conducted only in the town of Syosset. Prototype terminals in merchant locations were activated by plastic cards with account numbers coded in holes like those on telephone dialer cards.

Just as now, the customer's authority to use the card was validated by his keying in a secret number.

If the key-in did not match the number etched on a copper wire embedded in the card, the card could not be used. And the bank could not tell the customer what the embedded number was if the original instructions that came with the card were lost.

The 1971-72 experiment was closed off after 14 months of operation to evaluate the results. Acceptance was good by both customers and merchants, but the "almost handmade" terminal equipment used in the experiment had considerable problems, according to Mike Bonacum of the bank's research department.

In 1973 there were still no terminals on the market with the facilities the bank wanted and it

(Continued on Page 7)

Ralston Wants Afips to Be More Than 'NCC Purveyor'

By Catherine Arnat
Of the CW Staff

BUFFALO, N.Y. – The new president of the American Federation of Information Processing Societies (Afips), Anthony Ralston, has been "a relatively consistent critic of what Afips has done in the past" and will attempt to make the society "more than a purveyor of the National Computer Conference (NCC)" in the future, he said.

"Afips should be perceived as a spokesman for computer professionals," he said, adding it has been somewhat "ineffective in this role in the past."

Ralston hopes this situation will be remedied with Afips' Washington, D.C. office, which opened in June [CW, Sept. 10] and for which he pushed before he was elected.

Through the Washington office, Afips can "develop activities and contacts within the government so it can better represent there its constituent societies as well as feed information back to them," he said.

Ralston, who is currently a professor in the Computer Science Department at the State University of New York here, said he would also like to see Afips become more active on the international scene than it has been in the past.

He particularly mentioned participating in the International Federation for Information Processing (Ifip). Such participation has been minimal in the past.

Role of Coordination

Afips must limit its activities, however, to ensure it does not compete with its 15 constituent societies, Ralston said.

"This has been a problem in the past," he said.

"Our role is one of coordination of the various societies' efforts, rather than direct action.

"Afips must recognize the areas in which it is limited and not spin its wheels, and it must recognize those in which it's not limited," Ralston said.

Education is one area in which Afips is limited, but social concerns is an area in which the federation could do a lot, he said.

Although he hopes Afips officials take public positions on issues, they should not represent Afips' position, as it is difficult to get all the member societies to agree on a stand, Ralston said.

Licensing is an issue on which Afips should not take a stand, as there is a great deal of dissension among members on this subject, he said. His own opinion is "nix" on licensing proposals now in existence.

"On the one hand, we have a lot of people in the industry who are not competent, and licensing could possibly weed them out. But a great deal of study is still needed" on this issue, he said.

Ralston did agree the public needs protection and also suggested DPers should not wait for licensing to be "foisted" on them.

Afips should develop closer relations with the Institute for the Certification of Computer Professionals (ICCP), which administers the Certificate in Data Processing (CDP) exam, but added "we shouldn't do this (certification) ourselves."

He is not optimistic that remedies can be found to ensure professionalism, however. "We need less people with tunnel vision about their needs and jobs and more who look at the wider scope," Ralston said.

Afips is a federation, and should not act as its own entity, he stressed.

It will be more effective in representing user interests as well as those of the scientific community now that the Data Processing Management Association (DPMA) has joined, Ralston said.

In the past, Ralston had criticized Afips for many of the in-house, small research projects it conducted which he feels had little value for most users.

Afips Publication

He is considering starting an Afips publication, which he hopes will not compete with, but rather complement, those put out by Afips' constituent societies.

Bank Reinstitutes IT; EFTS Expands in L.I.

(Continued from Page 6)

went back to a prototype of its own design – "an outstanding one," Bonacum added modestly, "but one we couldn't afford to build ourselves in the quantities we wanted."

Early in 1974, the Amcat was announced and that seemed to meet the bank's needs. It had printer capabilities so the customer got a record of the transaction identical to the one generated within the computer. This provided the positive control the bank wanted, Bonacum said.

No Errors Yet

Under test for the past 14 months, the units have not had a single read error, he added. They are being installed in merchant locations – "just the high-volume retailers – supermarkets, drug stores, large hardware locations" – and are polled regularly at 300 bit/sec.

There has been no change in the Cobol-coded application programs, but the communications handler has been rewritten for the poll-and-select environment. There are eight lines running from the computer center here to branches in the North Shore area.

The lines feed into "bridge" equipment – "in essence, multiplexers – but dumb ones. They have no intelligence" – at the branches.

Telephone lines from the merchants feed into the "bridges" to complete the system. Multiple bridges can be linked and, indeed, are being used so two towns can share one of the trunk lines back to the B3500.

The merchants are experiencing "excellent response times," Bonacum ventured, adding "from 3 to 5 seconds after hitting the send key, the clerk is getting the start of an answer.

"Considering that the unit has to read and transmit the 40 characters from the mag stripe in addition to everything else, that is not bad," he said.

The software is currently being upgraded so IT can be used to support a reverse transfer of funds to cover return of merchandise or possibly receipt of deposits for the customer's account through a merchant's terminal, Bonacum noted.

But this probably won't be practical for a single bank, he said, so Hempstead is talking to other banks in the area.

Because of Privacy Legislation

Security No Longer 'Just Good Management Practice'

By Edward J. Bride
Of the CW Staff

MINNEAPOLIS – One of the results of current and pending privacy legislation is that people "are going to take security much more seriously" than when it was "just good management practice," according to Dan Magraw, assistant commissioner of administration for the state of Minnesota.

There are also some long-term and short-term savings resulting from the federal Privacy Act of 1974 and the Minnesota privacy law, Magraw told attendees at a session on the impact of privacy legislation at the recent annual conference of the Association for Computing Machinery.

These savings result from "our looking at just what data is being collected, making us answer the question 'do we need it?' " Magraw said.

In other words, privacy legislation may be experiencing one of its intended results – the diminished collection of some types of information, an attendee commented.

The session was sparked by an angry tirade which Minnesota State Sen. Robert Tennessen directed at Navy Capt. Grace M. Hopper.

Tennessen, a member of the federal Privacy Protection Study Commission, became impatient with Hopper when she asked about the commission's policy on interstate and federal-state exchange of salary information and about an attempt by one member of Congress to obtain personal information on an employee of the Defense Department.

When refused the personal medical information, the member of Congress, later identified as Rep. Bella Abzug, introduced a bill to permit members to have unlimited access to federal information, Hopper said.

"I don't like the military," Tennessen said. "You've been collecting information on people, and it's still being stored at Ft. Holabird, Maryland. You've said it was destroyed, but it wasn't."

Either ignorant of or ignoring the fact that the Navy has never been charged with this type of data gathering, Tennessen repeated, "You've still got that stuff at Ft. Holabird. You're not telling the truth."

Hopper had asked Tennesen how the commission would feel about congressional requests for medical information, which she described as "the most personal" type of information on file.

While medical information may be extremely personal, "so is personal, political activity," Tennessen shot back, recalling the Army's admitted data gathering of the late '60s.

He never replied directly to the question about whether the commission would try to prevent such congressional "snooping," but did say "I would hope that [snooping] would not happen."

In prepared remarks, Tennessen had expressed the view that the Federal government should pass "no more legislation than is absolutely necessary," leaving to the states the burden of defining and enforcing privacy policies.

Also a member of the Minnesota Privacy Commission, Tennessen acknowledged a weakness in the Minnesota law which states that data bank custodians should "attempt to notify" recipients of files when corrections have been made to files.

The provision of only attempting to notify means audit trails or logs of access are not required, he conceded in response to a question from the floor.

"We didn't know how much it would cost" to keep these records, he explained.

In discussing implementation of the Minnesota law, Magraw said the situation was "spotty at best." Some school districts and agencies are "not taking the Minnesota privacy law very seriously," he acknowledged.

Officials of some of the districts do not understand the legislature is not "requesting" certain procedures but that the law requires them, Magraw said.

CW Photo by E. Bride
Dan Magraw

Regarding the security issue, Magraw predicted that, as data base management systems get "more pervasive in the next 10 years," it will be easier to control access and beef up security. In fact, he commented, he is more concerned with the security of manual files.

Legal Complications Arise From Use, Misuse of DP

By a CW Staff Writer

MINNEAPOLIS – The legal complications surrounding both the misuse or failure to use a computer system are beginning to be clarified, but users may receive little comfort from the "clarifications."

Failure to use a computer, for example, may be tantamount to negligence if computers have proven useful for the application in question, but undue reliance on a computer can also be negligence, a panel member noted at a session at the annual confernce of the Association for Computing Machinery here recently.

All of the panelists were attorneys, but they kept their remarks free of "legalese" in pointing out some specific legal dangers which computer users may face.

Susan Nycum of the San Francisco firm of Chickering and Gregory recalled a 1933 case involving the sinking of a tug boat that was not equipped with radar. Despite the fact that not all boats were equipped with radar at the time, the question of foreseeable harm and the existence of an accepted product which could help avoid harm (radar) were considered legally as "lack of due care."

This same situation could apply to the computer and business today, she suggested. Legal considerations would also include "other forms of negligence" as well as the failure to use a proven product, she indicated.

There is, however, another side to this coin, and Nycum recalled the 1967 case of an automobile manufacturer's credit-granting arm, which experienced errors in its billing system and failed to credit payments to the proper account.

After failing to correct the system, the company repossessed an automobile. Its owner, who had in fact been making payments faithfully, won a court case, with the judge declaring the finance company had not used common sense in repossessing the auto.

Bob Bigelow, editor of the monthly newsletter, *Computer Law and Tax Report*, said he and Nycum had spent some time last August with a judge who was hearing a similar case and, on inquiry, Bigelow found out that the same finance company was involved. The circumstances were apparently the same – failure on the finance company's part to properly credit the payment of bills.

Nycum advised the audience to "use your common sense" in deciding whether – and how – to use the computer. Just as a person would not want to pay a bill twice, he should not send out a bill if it has been paid, she noted.

She also suggested management should use its DP contract to establish a chain of nonliability with vendors. When a procurement is being negotiated, for example, responsibility for delivery, performance and other considerations should be clearly outlined in the contract, she explained.

If a package fails to perform, the user then has legal recourse to collect damages from the vendor.

Retention of Records

Among other hazy areas is the retention of records and specifically what form or medium is required for retention.

While the Internal Revenue Service now accepts magnetic tape and microfilm as valid media for records, Bigelow said, there can be a problem if lawsuits arise between companies or between a consumer and a company if the state or local jurisdiction has not specifically authorized these media for use as "evidence."

Philis J. Scaletta Jr. of Purdue University recalled a creditor who sued a consumer for failure to pay bills. The only evidence the credit card company had, however, was the magnetic tape of credit transactions and not the hard, signed copies of the transactions.

Under Indiana law, Scaletta related, this was not "evidence," and the judge threw out the case against the consumer.

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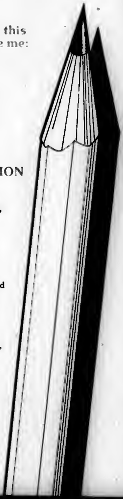

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Inhibitions Increase Longevity of Big Operating Systems

By Molly Upton
Of the CW Staff

MINNEAPOLIS – Several factors contribute to the longevity of large manufacturer-designed operating systems – not the least of which are the expense and reluctance of both users and manufacturers to invest in changes, panelists at a recent conference here agreed.

In investigating the reasons why there does not seem to be more transmission of techniques from research facilities to the manufacturers, panelists at the Association for Computing Machinery's annual conference mentioned problems imposed by commercial realities, such as user reluctance, as well as various difficulties in developing operating systems.

In addition, the few operating systems built by researchers have been small operating systems, since it is rare to find the resources available to support a system through the shakedown phase, according to Butler Lampson of Xerox's Palo Alto Research Center.

Two Motivations

Acknowledging manufacturers' operating systems are probably 15 to 20 years behind research systems, William A. Wulf of Carnegie Mellon University suggested two possible external factors that might motivate DP makers to change their operating systems.

One would be a change in basic computer technology that would afford cost effectiveness of about three orders of magnitude, such as a very large number of microprocessors rather than one central processor, he indicated.

Another would be legislation – a privacy act, for example, which in effect would make it "legally dangerous" to use the current operating system.

Although Wulf was not sure either case would happen, it does appear that only large external forces will cause changes, he said.

Two factors that promote the status quo are that both manufacturers and users have significant investments in their opeating systems and most users would scream if the manufacturer changed the system radically, even if there was a significant improvement, he said.

Also, although there are some new ideas that could migrate to the manufacturers' operating systems, the fact is "it is not always easy to graft features. There are good reasons why Fortran does not have some nice features . . . they don't fit. An attempt to graft is bound to product a monster," Wulf said.

Large Syatems Stable

Large operating systems are "enormously stable," Lampson observed. The evolution is slow and is conditioned by needs of compatibility and demands placed by users. Another factor contributing to stability is that the interface makes changes difficult.

Illustrating his point about stability, Lampson said the only major change in IBM architecture since 1964 has been virtual memory. Systems such as Scope, OS and DEC 8 are all 10 or more years old and substantially older than the hardware and most of the translators they use, he said.

F.J. Corbato of MIT said examples of systems that have impacted commercial systems are the CTSS and Multics projects.

CTSS, which was demonstrated in late 1961 and used in 1963, served to demonstrate the feasibility of a time-sharing system and influenced manufacturers to believe there might be a market for such a system, but there weren't any immediate commitments to the idea, he said.

The Multics project was influential in several respects, he said. Since the researchers were forced to articulate their goals before starting – a then-novel approach for software designers – they set an example of early software engineering, he said.

The project established that one could and should realistically implement a system in a higher level language, despite the "ponderous languagyof PL/1," he observed.

Multics employed virtual memory and showed paging and segmentation as feasible objectives, Corbato said.

It also put forth the idea that the difference between batch and time-sharing is one of degree and that it is possible to have both capabilities on one system.

The system exhibited early forms of structured programming with its high degree of modularity, about 1,000 to 1,500 modules, he said.

In addition, Multics tried to call attention to privacy and security and the importance of building in these safeguards at the start rather than as a patch at the end, Corbato said.

Part of the problem in influencing the manufacturer is the restrictions in the exchange of knowledge, Corbato said. Transferring people is one method, "but we don't have universal cloning yet."

Ideas are hard to describe in 1,000-word papers, and books are also difficult, he added.

It is hard to approach manufacturers, because the "Not-Invented-Here" syndrome has to be countered, he said.

Corbato said he sees more progress in specialized systems than in general commercial operating systems.

Project Sue Lessons

Jim Horning, who was associated with the University of Toronto's Project Sue, gave some first-hand accounts of pilfalls encountered.

The project involved selecting various ideas incorporated in various laboratory operating systems and placing these on an IBM 360.

When taking solution A and adding it to idea B, those involved in the project wound up doing more extensive redesign than they had anticipated.

Project Sue assumed the researchers had solved wider problems than they thought they had, but discussions with the researchers showed this assumption was not necessarily valid.

At Project Sue, they saw small systems can live with restrictions that are unacceptable in larger systems. In generalizing a solution one often destroys the simplicity and efficiency, he said.

There is room for improvement in operating systems, panelists said, and one specific area mentioned was in user interfaces.

Lampson said a good user interface requires a very different kind of skill from that needed to get a system up. The ideas are not new, but need fermenting.

It takes a long time before one can find a way of making things manifest so they seem as simple as using a typewriter, he said.

Editorials

No DAAs

The sensible solution to network protection is now undergoing its initial phases in California [CW, Oct. 29] and should lead the way to a nationwide reform in the regulations regarding interconnection of non-Bell equipment with the nationwide telephone network.

Until now all computer users who did not stay with "Ma Bell" for their interconnect equipment were forced to rent a Data Access Arrangement (DAA) from that company.

Now in California the Public Utilities Commission is allowing non-Bell modem manufacturers to build DAAs into their systems and sell the complete package to the user. The built-in DAA is required to be certified by independent examiners and, once it is, there is no longer a need to use a Bell DAA and to continue to pay Bell for it.

The California plan should be implemented by other states and by the FCC on a national basis.

It assures protection for the network and at the same time frees computer users from unnecessary charges.

CW Needs Net Data

This month *Computerworld* will feature a supplement on data communications networks. If you are now operating a network or are planning one, please take a few minutes to fill out and return the survey below.

You may return it in the postage-paid subscription envelope stapled into this issue; just write "Editorial" on the outside of the envelope so your vote can be tabulated quickly.

We now operate a network that contains the following:

Type of terminals: Interactive ____ CRTs ____
Remote batch ____ Intelligent ____
Other ____________

Type of line: Phone co. ____
Mix of both ____
Specialized carriers ____
If special carriers, which ones? ____________

Transmission: At what speed do you operate? ____________
Do you have multiplexers or concentrators? ____
How many of each? ____

Is your net regional or national? ____
Dial-up or private lines? ____ Or both? ____
What are the major applications? ____________
____

How many different vendors supplied the equipment in the net (modems, terminals, CPUs, etc.)?
____

What network upgrade are you planning in the next year? ____________
____

What are your biggest network operating problems?
____

My job function is:
____ Programmer/Analyst ____ Management
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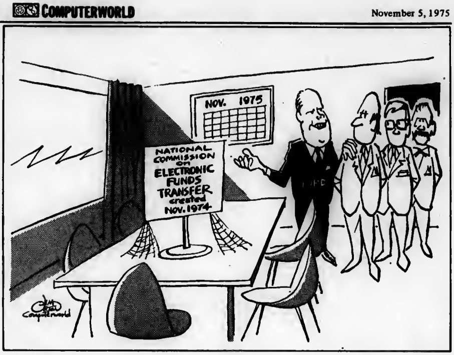
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Computerworld

'I'd Have Appointed You Gentlemen Sooner, But Now That I Know You Understand New York Is Off Limits . . .'

Letters to the Editor

Memorex MRX/50 Software Support Available From Independent Firm

In the Oct. 22 article concerning user satisfaction with the Memorex-50 hardware, I must take issue with the statement that "vendor software support is not available to the MRX/50 user.

Support of the released Memorex software product has been available and continues to be available despite the mid-1973 withdrawal by Memorex from the mainframe business.

Such support was first provided by Memorex through the end of 1973. During the last two years, the support has been provided by our independent company, Programming Research Associates.

It is true our company is not a vendor, but it does support the vendor software. We possess an MRX/50 system for use in investigating problems; we have the only complete library of Memorex source code and documentation; and the principal employees of the company are all former employees of Memorex in Minneapolis.

Being disassociated from Memorex does not diminish our capability of providing effective software fixes for reported problems.

Memorex, in fact, endorses our activities, having contracted with us to provide support for its base of lease customers. Independently, we offer the same support to the base of purchase customers.

The article failed to acknowledge the existence of any software support for the Memorex System. We recognize the energy spent by a few of us in support of the software may not be deserving of much recognition in the total DP community.

The number of individuals involved in the original development of the software was rather significant, however. The products developed by these individuals were, for the most part, quality products. (From our viewpoint, the current RPG compiler, which has had only three minor bugs reported in the past year, is certainly in better than "flaky" condition.)

A few words acknowledging the Memorex software is being improved, thus enhancing utilization of the system, would have been gratifying to those who devoted so much effort to their product, but were then denied the opportunity to observe, at first-hand, the acceptance and utilization of their product by the user.

Thomas A. Conley

Minneapolis, Minn.

Claims About 5100 Exaggerated

The announcement of IBM's new 5100 desktop computer [CW, Sept. 17] caused a flurry of excitement in our R&D organization. Its power looked very impressive. We envisioned using several to edit, reduce and store laboratory data for off-hours transmission to our host computer.

Then we read the fine print. The corporate arrogance of IBM rides again. The 5100 will not interface with laboratory instruments and it will not communicate (in Ascii) to our non-IBM host. Claims that the 5100 has a place in the scientific market are grossly exaggerated.

Charles R. Watson

Richland, Wash.

Simpler Check-Digit Method Used

We are using a check digit method which gives us 100% protection against single-digit errors and adjoining-digit transpositions and is less complicated than the method described by Alan Taylor [CW, Oct. 22].

We just divide the number by 11, convert the remainder to a letter and append that letter.

Pierre H. Berube

Keene, N.H.

Thank You, Herb Grosch

In reference to the column, "Women on Top," I would like to say: "Thanks, Herb Grosch! Couldn't have said it better myself!"

Margaret A. Denty

St. Petersburg, Fla.

College Seeks Data on Women

I have been following with interest the controversy over the rights and opportunities for women within our industry.

The Student Counseling Bureau at the University of Minnesota has been attempting to gather statistics on women in DP, in an effort to broaden the horizons of such women.

While we at the Society of Certified Data Processors (SCDP) have attempted to assist the bureau, returns have been minimal and the sampling of females in the industry has been woefully inadequate. To date, after several months of effort, the bureau has yet to gather sufficient data to obtain an accurate statistical sample.

So I encourage women who are willing to participate in this survey to obtain the data collection forms from Dr. Jo-Ida C. Hansen, director of the Student Counseling Bureau at the Office of the Dean of Students, Center for Interest Measurement Research, University of Minnesota, Minneapolis, Minn. 55455.

Kenniston W. Lord Jr.
President

SCDP
Washington, D.C.

(Other letters on Pages 11 and 12.)

Letters to the Editor

Generalizations Unfair to Women

When are men, such as Prof. Jack M. Wolfe ["Women Don't Want Promotions," CW, Oct. 15], going to stop generalizing about women? When assessing a male, I'll wager Wolfe does not assume:

- He's a father.
- He might leave because his wife obtains employment in another city.
- He might want to change careers.
- He might consider social life important, etc.

Presumably he judges other men as individuals in their own right. When, oh when, are women going to be accorded the same privilege?

Marianne S. Mantle
Akron, Ohio

Basis Insufficient

In reply to Jack M. Wolfe's comments in the Oct. 15 issue of *Computerworld*, I wonder whether Wolfe feels his experience as one individual is a sufficient basis for his broad statement about "women" in general?

He stated: "The average period of employment of women programmers is noticeably less than that of the men." This contradicts the article on Page 8 of this same issue ["Management Problems Promoting Women Self-Imposed"] where reference is made to "statistics from the Department of Labor showing the average length of service by women is comparable to that of men."

The studies with which I'm familiar show the road upward is definitely harder for women as a whole. But only by judging on individual merit can our stereotypes of male and female be overcome, thus allowing us to choose the best person for a job.

Marcia Kolar
Glen Ellyn, Ill.

Needs Guidance Badly

The letter from Ed Tunstall [CW, Oct. 15] titled "Grosch Right: NCR Never Entered DP Mart" deserves a response because Tunstall evidently needs guidance desperately.

How can a real DP manager live with the situation he described without taking corrective action? Has he voiced his complaints to proper NCR and school district management?

He evidently knows how a computer should properly function, so why in the world has he settled for less over the past two years?

If Tunstall truly wants the NCR situation corrected and has exhausted all possibilities within local NCR management, he should pick up his phone and call William S. Anderson, chairman and president of NCR.

If his complaint is valid, Anderson will take corrective action, and I doubt if it will take him two years. And, once things are running smooth (as most NCR installations are), Tunstall can honestly call himself DP manager.

Al Hains
Santa Monica, Calif.

HEW and DOD

One of the first shockers to come out of Jerry Ford's Washington vis a vis the new security and privacy legislation is the disclosure that HEW intends to blatantly and shamefully violate the spirit of the law, and quite possibly the letter as well. Callously using as an excuse the notion that interactions between major subdivisions of the Department of Health, Education and Welfare are internal administrative matters, these ugly people intend to continue to transfer personal data at their convenience between the myriad data banks in their bureaucratic empire.

Note that these data banks exist in such itty-bitty outfits as the Social Security Administration (operator of what is almost certainly the largest bank of personal data in the western world), the National Institutes of Health, the education moguls, and so on.

In defense of the majority of senior people involved, these policy and legal arguments must be clearly understood to be at the level of the Administration's political appointees, not down among the civil servants. The assistant secretaries and counsel involved are Nixon and Ford men, not careerists.

This is much less a factor in the Pentagon, where the strong armor of military dominance protects the occasional desire to do good, along with the usual desire to do well, and the frequent desire to crunch us up. As an example, I have read (with great difficulty, due to the almost impenetrable bureaucratese) the Navy and Air Force directives on personal data and privacy put out within DOD following activation of the Privacy Act of 1974. The Navy has already made a test application of the DOD instructions in its Office of Civilian Manpower Management, the Air Force has hired Rockwell International to do an analysis of the impact of the Privacy Act on its operations, and both services give every indication of cooperating through the Defense Privacy Board established by order of the Deputy Secretary last April.

DOD appears to mean business, and its data bank operators, no doubt wringing their hands and their budgets the while, are facing up to the great difficulty and expense of compliance. Maybe they're conning us: CW intends to keep watching. But the initial impression is very favorable indeed.

Contrast this with the HEW subterfuge and the corrupt support the early CW and ACLU reports indicate it received from Justice Department lawyers and from the Office of Management and Budget. I'm reminded in an entirely different context of the way that the Nixon OMB quietly emasculated the Brooks Bill by closing down the tiny group supposedly devoted to implementing the policy of efficient computer usage in the federal establishment, after Joe Cunningham retired.

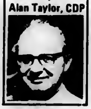
Unless public protest via the Congress has an effect, no record will be kept of personal data transfers, legal or illegal or absolutely outrageous, between the data empires of HEW. To stimulate such protest, I sincerely hope that men and women inside and outside Washington who observe or have good evidence of such transfers keep the Civil Liberties people and the Nader types and the media (us!) on the alert. Evil, as I so often am forced to say, never sleeps. *Aux armes, citoyens!*

Herb Grosch

Error-Avoidance Method Requires No Check-Digit Use

The Taylor Report

By Alan Taylor, CDP



Computers, when really put to use, have many different ways of reaching a desired result.

In the past we have been mainly concerned with adapting old methods to the abilities of the computer age. Now, however, it appears those old methods are going to have to be compared with brand-new methods which owe their practical existence to the computer's abilities.

A brand-new computer-age method of checking for transposition and transcription errors in account numbers, etc., which doesn't require any computed check digit, has come along in response to recent discussions in this column [CW, Sept. 17, Oct. 22].

Now an installation has two completely new alternatives to the traditional weighted-multiplication check-digit methods – the Deeds code-and-reduce system and this new one.

Like check digits, the aim is simply the avoidance of errors.

In the number-selection method, the technique is simply to use only those numbers that have checkable characteristics that are known in advance.

It is known, for instance, that any number that can be divided by eleven, if all but one digit is transcribed correctly, simply won't be divisible by eleven. Therefore, a system that issues only numbers divisible by eleven can be checked for single-digit transcription errors and the other characteristics of divisible-by-eleven numbers.

Double Safeguard

Such a system would have a double safeguard because, should an error creep through as a result of a programming fault, it would still not result in an item being posted to a wrong account, for instance. There simply wouldn't be any account number to which to post a wrongly transcribed number.

So not only is a check digit unnecessary, but the normal account-number matching logic does all the necessary checking of the results.

With such a system it would be possible – as DP Director Edward C. Marzo of Spartanburg, S.C., pointed out to get all the advantages of the Modulo-11 check-digit systems without fitting 11 situations into a choice of 10 available digits.

It goes further, however, because it can also be used to exclude undesirable, error-prone cases from the series at minimum cost.

Take the case illustrated in the Sept. 17 column, where the transpositions 90 and 09 would not be caught by the 12121 weighted type of check-digit system. The accuracy of the system (that is, its ability to catch single errors or transpositions) could be improved by omitting from the series any number having either a "90" or a "09" string if it.

Other errors such as transpositions between the check digit itself if put into the last position and the adjacent units number of the system can be identified in advance.

The 12121 weighting system, for instance, fails to detect transpositions of 6 and 3, 5 and 2 or 7 and 4. This could be eliminated from the system simply by not issuing any number which ends with 6 and has a check digit of 3, etc.

Such a selection process could not reliably be handled prior to the computer age. The use of consecutive-number issuing was far less error-prone than any other available manual system. But in this day and age, where numbers are originally issued by the computer, use of selected numbers only becomes practical as well as desirable. The question now becomes what characteristics the numbers selected should have.

Other Systems

For instance, the principle is not restricted to Modulo-11 systems. Larry Pendarvis of Digitex Corp. compared the characteristics of Modulo-11 and Modulo-13 selected numbers (11, 22, 33 . . . vs. 13, 26, 39 . . . etc.). The Modulo-11 system does not catch errors involving transpositions over odd numbers of intervening digits, such as where 132 is written as 231. Both of the numbers divide evenly by 11, so the system would leave such errors undetected.

The only way to eliminate such a fault would be to arbitrarily select one or the other as being the only possible acceptable number. If, for instance, it was decided to accept only the smaller numbers, this would eliminate 50% of the available three-digit numbers, 67% of the available four-digit numbers, 80% of the available five-digit numbers, etc.

By contrast, the Modulo-13 system detects all single transpositions across any one, two, three or four intervening digits. And, on seven-digit numbers, the Modulo-13 system provides 759,231 protected numbers as against the 909,091 semi-protected numbers available from the Modulo-11 system. By way of contrast, Pendarvis pointed out the Deeds method of check-digit protection provides 1 million protected numbers under the same circumstances.

On the surface, this argument can go on and on with no end in sight. However, there appears to be some form of a limitation.

At the current state of the art, we can detect only single errors. How frequently double errors occur I don't know, but presumably a calculation based upon the number of detected single errors could provide some form of an upper limit for the occurrence of double errors.

With this estimated or established, it would be possible to identify how far it would be worthwhile to go in providing safe computerized account numbers under various systems.

All the systems could be compared on an apples-to-apples basis, and we could improve the efficiency of number control by bringing it into the computer age. And that would certainly be a great advance. More news soon – and please keep your letters on the situation coming.

Letters to the Editor

'Software Program' Still Undefined After 17 Years

Without doing any more than the little research Roy N. Freed did for his Oct. 15 column, "Definition of 'Software Program' Can Vary," I would guess that few professionals in the field would concur with the proffered definition of "software program."

Perhaps Freed should first generate a suggested definition for "program," *then* get into subdefinitions of the noun as modified by such words as "software," "hardware," "hand-wired," "applications," "systems," etc. ad nauseum.

To me the compound term "software program" suggests a particular subclass of programs which are introduced to the computer from external sources and may be changed at will (from "soft") and are generally conveyed to the user by sale – bundled or unbundled, "systems" or "applications" (from "ware").

Let's hope Freed's future columns and other reader letters can clarify this confusion which has confounded me for 17 years.

E.K. Zimmerman

Washington, D.C.

Argument Nonsensical

After reading David A. Fuller's letter [CW, Oct. 8], I am forced to conclude that one or more of the following must be true:

- Fuller doesn't pay attention when he reads.
- Fuller goes into mental spasms when he sees certain words such as "abortion."
- Fuller has his data bus scrambled.
- *Computerworld* made up David A. Fuller to generate some controversy.

Whatever the true choice is, Fuller writes a pretty wild – and pretty distorted – letter. The first sentence of the article, "Passage of Abortion Law Credited to Mini Data" [Sept. 17] mentioned that Barbados passed an abortion law after receiving a projection of future population vs. food supply done on a computer.

That was one sentence out of 11-1/2 column inches. The remainder of the article carefully explained how the computer system was used to contrast projected population with projected food supply and projected energy supply, mentioning that these projections were given to the officials of the country concerned from whence they could draw their own conclusions to guide their planning.

From this, Fuller concluded that "it is unfortunate the minicomputer was used as a tool to generate fear – a selfish, depraved fear."

Fuller's major argument seemed to be to equate the fetus to the Negro in 1857 and to equate abortion to death and torture for black slaves. That argument may have a high emotional content, but it has absolutely zero rational value. It had no relation to the article in question.

Projections of that sort are really very simple. Given the situation which prevails, X number of mouths will need to be fed at some point in the future.

Barbados, very rationally, prefers population control to starvation . . . how it chooses to control its population is another question altogether.

There is absolutely no basis for believing in the bloody reign of terror Fuller insisted on conjuring up. His letter was nonsense.

Laurance F. Wygant

Schiller Park, Ill.

Courtney Speech Available

I read with interest the Oct. 8 Taylor Report, "Releasing Statistics Could Aid DP Fraud Prevention."

In the article, Taylor quoted Robert Courtney of IBM. I would like very much to obtain a copy of Courtney's speech.

W.M. Boardman

Orlando, Fla.

No printed version appears to be available, but a tape cassette of Courtney's speech can be obtained for $9 from the Data Processing Management Association (DPMA), 505 Busse Highway, Park Ridge, Ill., 60068. Ask for Data Security Cassette No. 5 from the DPMA 1975 International Data Processing Conference. Ed.

Readers Have Wrong Man

A report on a National Computer Conference (NCC) panel session entitled "Programming – Art, Science or Engineering?" [CW, June 4] erroneously attributed to me allegations that the New York Times Information Bank Project was a "disaster."

A correction [CW, July 16] stated rightly that Ed Yourdon, another panelist, in fact made these allegations. Since I have no first-hand knowledge of the Times Project, I am not in a position either to defend or refute Yourdon's claims.

Despite the correction, *Computerworld* continues to receive letters on this subject, and I as well.

I hope readers, now knowing who said which about what, will send their inquiries and angry letters to Ed Yourdon and permit me to fade back into anonymity.

Peter J. Denning

West Lafayette, Ind.

Two Important Lessons

Gerald L. Bortle [CW, Oct. 1] indicated his technical or professional knowledge as a DP manager did not improve as a result of the article, "Users Who Ended Contract Say Honeywell Tried to Take Specs" [Sept. 10]. He should either be complimented or criticized.

The article carried an important lesson which should be of interest to any DP manager who plays a role in the purchase of new equipment: Don't make assumptions regarding documentation – specify what is required in the purchase contract.

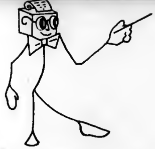
The article also carried an important lesson to any computer system purchaser who did not specify documentation: Run, don't walk, to your friendly system supplier (while he is still friendly) and obtain a definitive statement, in writing, about what documentation is yours and what is his.

Unfortunately, maintenance considerations are often overlooked when purchasing new equipment since the focus is usually on the problems being solved. Nevertheless, there are many maintenance-related items which should be a part of any purchase contract.

It is much easier to obtain the necessary documentation, or to consider alternative sources, before a contract is signed than to resolve a conflict with a supplier who feels he has already lost a customer.

L.A. Benton

Del Mar, Calif.



PAT Only Part of Process

Well-Planned Screening Builds Small, Stable Staff

By Don Leavitt
Of the CW Staff

GRAND RAPIDS, Minn. – Blandin Paper Co. has moved through a succession of computers in the past seven years, but the approach it set up in 1968 to build and keep a DP staff has worked well, according to its systems and computer services manager, Doug Englehart.

Grand Rapids is 180 miles north of Minneapolis, 80 miles west of Duluth and even today there is no pool of programming talent looking for work in the town of 7,000 people. So Blandin looked inward and offered all employees the chance to take IBM's Programmer Aptitude Test (PAT).

The company sensed that aptitude measured by PAT shouldn't be the only criteria so, after giving the test to about 200 workers, it screened the top scorers through interviews with their current managers and through talks with the potential programmers themselves.

Past performance, the managers' recommendations and concern for the personalities of the people being screened weighed only slightly less than the PAT socres, Blandin said. In any case, four people were finally selected and all had test scores in the "A" range.

Started With Cobol

Blandin started with the idea of working in Cobol, but the engineering needs of the company indicated a need for Fortran or similar capabilties as well. In order to keep to just one language, training started in Cobol moved to PL/I and, by early 1968, the original crew was at work.

The first computer – a 360/40 – was delivered in the fall and by the end of the year the programmers – three men, one woman – were "reasonably proficient," in Englehart's view. Training was partly through courses at IBM "ed centers" but primarily in-house, with programmed-instruction manuals.

The early work was largely accounting or business-type applications. General accounting, cost accounting, general ledger, payroll "and the usual things" were installed, he said. But so were some more esoteric projects, such as timberlands and forest inventory control.

The operation grew and equipment changed from the Model 40 to an IBM 370/135 and then "back down" to a 370/125 as the installation gained a better understanding of what it had to do.

Meanwhile, the crew grew by another three, with just about a year separating each addition. The newer people were also selected through the PAT/interview-screening process, Englehart noted.

The move to the 125 had two purposes, he went on. It reduced the monthly rental charges and, at the same time, allowed the use of faster peripherals.

The rental cut was matched by a change from a 600 line/min printer to one capable of 1,100 line/min and the implementation of IBM 3340 disk modules. The 160K system operates under DOS/VS, the manager added.

Peopleware

Englehart recognizes "there's always a need for ongoing training," but the size of the present crew and its remote location has led to one basic thought: No matter how good a course may sound, Blandin will never send out the whole staff at one time.

Instead, Englehart encourages each of the staff to pursue his own particular interests and, if a course is available that clearly fits a need, the appropriate person is sent. Once he's back on-site, however, he must assist in training the others in the material he learned while away.

Use of the masculine pronoun in describing the current staff members is correct, Englehart said. The woman who was part of the original crew has been shifted out of programming and systems per se and into the new position of coordinator of outside services.

Moving Up

Another of the Blandin DP pioneers also left the programming scene – to become manager of computer operations. He and one of his operators ("a technical type," according to Englehart) are responsible for maintaining the operating system so they still work closely with Englehart's systems and programming staff.

The staff has considered the possibilities of such "hot buttons" as data base management systems, but Englehart feels that "even before those things become popular we did a pretty good job of integrating things."

One project his crew is involved in currently is linking a System/7 on the factory floor to the 370/125 for data gathering rather than any attempt at direct process control.

Network Study Results Listed

GREENWICH, Conn. – A series of benchmarks run on a number of remote-computing networks were designed to provide insight into the pricing methods and billing algorithms of the networks, according to Real Decisions Corp. (RDC), publisher of an 80-page report of the test results.

The researcher would not release specific details of its findings, but noted five different programs were utilized – one each in Fortran and Cobol and three in Basic. Three of these were run three different ways to increase core, CPU usage or I/O requirements.

The objective, RDC claimed, was to force each system to perform each program "in a simple straightforward manner" and added that "many vendors offer optimized versions of the languages utilized in these tests."

The RDC goal was to compare effects of different pricing structures on common resource utilizations, not to optimize a particular program, the company contended.

Runs were of "fairly small duration" and a technique was devised to simulate low, medium and high usage of connect times and storage utilization. These synthetic figures were used in various combinations and added to actual CPU charges for each program, the evaluator said.

This process produced total cost figures "which can be utilized to more accurately project vendors' price performance results to user characteristics," the researcher asserted.

Within the report, detailed results are provided for all runs made on each vendor. Several graphs are also included which compare results across vendor lines.

The report is available. for $600 from RDC, 270 Greenwich Ave., 06830.

Program Utilizes IBM 3270 CRT For Hexadecimal Calculations

SACRAMENTO, Calif. – The Hexcalc routine from Software Module Marketing (SMM) is designed to provide programmers working on IBM 3270 CRT terminals in CICS environments with the means of doing hexadecimal conversions "for the price of a hand-held calculator," according to the vendor.

The $395 package supports conversions from "hex" to decimal, and from decimal to "hex" notation. It also supports both decimal and arithmetic operations so displacements and other forms of relative addressing can be determined, SMM said.

The arithmetic operations are enhanced through the availability of a built-in "constant" facility if the programmer wishes to utilize it, the vendor said.

The CRT comes into play more directly as a replacement for hard-copy printouts with Hexcalc's ability to display portions of core, including paging activity for VS installations, and to display the various tables that are critical to CICS operations.

Working with hexadecimal notation is often time-consuming and subject to errors for programmers raised in a decimal environment. Hexcalc allows the intermixing of "hex," decimal, constant and table equations to simplify the basic conversion processes, SMM noted.

The routine works under DOS, OS and VS versions of CICS on IBM 360s or 370s and can be ordered directly from the vendor at the Crocker Bank building Penthouse, 1007 Seventh St., 95814.

Low-Cost 'Dream' Eyes Systems

AKRON, Ohio – The Dream software monitor now available from The Software Factory is described as a highly efficient and versatile system performance tool geared to the tuning of IBM 360/370 OS or OS/VS systems.

Stressing low overhead – "typically 0.5% to 3.5%," the vendor claimed – Dream provides both detailed and summary information about the system under test. System waits due to enqueued resources; specific device activity, including the percentage of control unit busy, data transfer and tape error information; and SVS usage are among the information reported.

Data on resident and non-resident module usage is also part of the Dream output, as are reports of I/O interrupts including interrupts satisfying user-specified CSW status bytes.

One of the most useful Dream reports, according to the vendor, is one giving detailed data set activity resolved to the cylinder level. Data set names for the associated activity are explicitly displayed, the vendor noted.

Written in Assembler and admittedly less powerful than some other measurement tools, Dream is also considerably less expensive than others, having a one-time cost of only $5,000.

The Software Factory can be reached through P.O. Box 1118, 44309.

Retrieval Package Simplifies IMS Use at University

By John Jarrard
Special to Computerworld

KNOXVILLE, Tenn. – After extensive evaluation of five data base management systems (DBMS) last spring, the University of Tennessee Data Center here bought IBM's IMS.

Our reasons for going with the DBMS were the usual ones: we wanted to eliminate redundancy of data, to consolidate diverse data elements and to provide direct data access to users. But more importantly, the DBMS would allow us an organized growth potential to handle more data for more users and to go with teleprocessing in the future.

Even though we feel IMS is the best DBMS for us, we would be far less satisfied if we hadn't mated the system with Easytrieve, an information retrieval software package from Pansophic Systems.

We have used Easytrieve under OS and DOS for some time to supply several hundred users with reports they need at a fast turnaround. It seemed a natural decision to buy the IMS interface to Easytrieve when we decided to go with IMS and, in fact, 60 days after IMS was installed, we linked the Easytrieve/IMS Option.

Our data center is the hub of five remote job entry (RJE) sites, all campuses in the university system. Information and report requests are fed in from Chattanooga, Memphis, Martin and Nashville via Data 100s and are processed here on an IBM 360/65 with IMS under OS.

Using Eastrieve with IMS-stored information is much like using the system with our standard files – the actual functions are the same. The big plus is that we are able to get information from IMS quickly and in the format we want.

We are able to use the Easytrieve Macro Processor to produce routine reports with single commands or, if the report is to be customized for each RJE site, we run the specific location part of the input and include the basic report with a macro command. Easytrieve reports are pretty fast to write even if one has to write out the whole report, but the system macros make the job even faster.

Speeds Program Development

One extensive use for Easytrieve is to speed the development of our Cobol programs. We did it before IMS and now we do it with IMS. We can load data into IMS, use Easytrieve as a utility to extract the data with which we want to work, do our debugging with that test data and then proceed to the completed program.

Using the Easytrieve utility for test data and debugging gets us to that final program faster, which increases our production program productivity.

It was our plan from the beginning of our IMS relationship to allow ourselves time to get used to the DBMS. We knew the new concepts and capabilities would take some familiarization. The university workload is much lighter during the summer and we took that opportunity to work with IMS.

Now that the school year has reconvened, the flow of information requests has begun to increase. We have 20 procedure libraries set up at this time for initial IMS work. Of course, this is just a start for us; we won't be servicing all of our users with IMS for some time. But now we know how long it will take.

I also know that, if we weren't using Easytrieve with the IMS-stored data, we would be in for at least double the work to get information out of the data base. The IMS interface took about 30 minutes to learn at the beginning and it's saved its cost many times over already.

Although we are still somewhat new to IMS, we are looking toward a planned growth capability with the DBMS and staying on top of the entire workload, as we have in the past, with Easytrieve.

Jarrard is a systems analyst at the University of Tennessee Data Center in Knoxville.

Modified Supervisor Cuts S/3 Disk Need

CANOGA PARK, Calif. – A software package developed by the Group/3 Division of Informatics, Inc., Elimn8, modifies IBM's control software to eliminate the need for an additional disk drive on the IBM System/3 Model 10 for users working with IBM 5445 drives.

IBM software calls for users of the 5445 drive to also rent a 5444 drive, Group/3 explained. Elimn8, which resides on the 5445 drive, "precludes this requirement," according to an Informatics spokeswoman.

Use of the independent's supervisor modifications is transparent to the user, requiring no changes in the OCL parameters.

In addition to voiding the need for a 5444 drive, the package is said to support four basic functions: it copies a 5444 pack to the first 5445 drive (D1); removes a 5444 pack from D1; copies a 5444 pack to a 5445 file; and copies a 5445 file to a 5444 pack.

Monthly rental of the Group/3 Elimn8 package is $99, which the vendor was quick to compare with "about $300" being charged for an IBM 5444 drive.

The software may be purchased for $2,000.

Group/3 is at 21050 Vanowen St., 91304.

'Infomacs' Adapted To Support OS User

VALLEY FORGE, Pa. – Infomacs, the report generator and file-stripper and reformat package from Management and Computer Services, Inc. (Macs), is now available under IBM's OS as well as under DOS, the vendor has announced.

At the same time, the DOS version has been extended to support all IBM disk devices including 3330s and 3340s, Macs added.

As a report generator, Infomacs is designed to produce customized printouts through sets of parameter cards. The basic logic can also be used to select records from existing files, based on user-defined criteria, to create "live" test files.

Built as a load-and-go processor, Infomacs eliminates compile time, which tends to get one-time reports done more quickly than if they had to go through conventional programming operations.

Infomacs is available now – for either DOS or OS installations – for $2,800. Macs is at 790 Valley Forge Plaza, 19482.

Structured Program Guidelines Found in ACM Effort

By Daniel Couger

Special to Computerworld

Concepts and Techniques

The editors of *Computing Surveys* set out last year to pull together a series of articles from experts to establish definitive rules for structured programming. Ultimately, the guest editor selected for that issue, Peter Denning, came to the conclusion there are no such rules. Nevertheless, the special issue of the Association for Computing Machinery's (ACM) publication – with five papers on the subject – is outstanding.

Reviewing issues raised by the authors, Denning said "there are guidelines and good ones at that; but the individual programmer's style (or lack of it), his clarity of thought (or lack of it), his creativity (or lack of it) will all contribute significantly to the outcome.

"One of the first viewpoints one encounters in discussions of better programming" he noted, "focuses on the environment in which programmers work. This viewpoint is characterized by the assertion that if only project supervisors would get their programming staffs to follow straightforward practices of good management – especially in regard to project organization and documentation – the main part of the programming problem would vanish.

"The first two papers of this issue address this view. The paper by P.J. Brown is a short, light and pleasant essay describing two sterotypical programmers.

"The paper by J.M. Yohe, cast more seriously, systematically outlines some commonsense management practices which ought to be followed in every programming shop. However obvious the points made by Yohe might seem, the fact remains a surprising number of programming shops fail to follow simple rules, and this failure suffices to flaw their endeavors."

Second Viewpoint

"A second viewpoint is concerned with the structure of the product itself – the program. At this point the term structured programming finds its way into the discussion," Denning noted, "[including] two of the most popularized ideas of structured programming, the use of restricted control structures and the use of top-down programming.

"The paper by Niklaus Wirth presents some interesting examples of these two sets of ideas," the editor said, "and suggests that (in the author's experience) one can almost always find another way of solving a problem in which only the restricted control structures are used, while the efficiency of the resulting algorithm is left unimpaired.

"Those interested in the relationship between using the restricted control structures and not using the persecuted GOTO statement will find considerable material to digest in Donald Knuth's paper. He carefully presents all the known viewpoints both for and against the GOTO statement and, in the process, gives many excellent suggestions on programming.

"He shows that the so-called GOTO controversy has served its role in awakening our attention to the influence a program's structure can have on understanding the program itself and proving it correct. And he has convinced me, at least, that we should lay this controversy aside and concentrate our energies directly on the issues which gave it birth: the principles of good programming.

"A third viewpoint on programming mingles elements of each of the two preceding philosophies. It concentrates on programming style as the key question. From this viewpoint good documentation and project organization [and] good use of simple control structures and hierarchical modularity [are] necessary and important.

"The paper by Brian Kernighan and P.J. Plauger exemplifies this view. The present work is related to their book, which I also recommend to all programmers.

"You will find in their paper examples of programs which look like structured programs but, on closer inspection, prove obscure or even to contain bugs. You will find examples of programs which look unstructured (containing, for example, GOTO statements) but which are quite understandable. You will find examples of programs which look well-indented and properly commented but which, on closer inspection, prove to be unnecessarily complex by an order of magnitude."

Central Idea Missing

During the process of selecting papers for one special issue, Denning reviewed "many papers purporting to show by example how the so-called rules of structured programming operate.

"A common mode of exposition was: Consider versions A and B of the program; B was constructed using structured programming, A was not.

"To the eye of the casual observer and the trained referee alike, both versions were equally obscure. Somehow authors did not bring out the crucial central idea: namely, that one is always working with abstractions."

Denning asserted it is not sufficient to present the end product and expect the beholder to perceive its structure by inspection or "even by deep meditation."

Denning believes "good programming style is not automatically introduced by the rules of structured programming, any more than good English prose style is guaranteed by following the rules listed by Strunk and White in *The Elements of Style*, even though these rules can go a long way toward influencing programmers or writers toward a sense of good style."

Couger is professor of computer and management science at the University of Colorado.

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Pacific Telephone Plans Packet-Switched Service

By Ronald A. Frank
Of the CW Staff

LOS ANGELES – Pacific Telephone and Telegraph will provide a packet-switched communications service for the California state college system beginning in April.

The packet-switched network is being provided as a turnkey system including hardware and software and will link 19 California colleges in all areas of the state. The hub of the packet network will be here at the chancellor's office of the state university and college system.

Traffic on the net will include student computation in engineering, business administration, science and other curriculums, according to a spokesman for Pacific Telephone. The student applications will be part of a time-sharing system to be run on the intrastate packet-switched network.

Additional Terminals

In addition, each of the campuses connected to the network will have at least one remote batch terminal for accessing a separate central batch CPU here.

"We are using packet technology," the Bell spokesman said, "to connect asynchronous terminals which we bring in from the nearest node at each campus. We packet the information at the nearest network switch and carry the data through the network in a packet configuration," he said.

For the time-share traffic, a serial high-speed bit stream will be delivered to the mainframe at the chancellor's office where the message will be demultiplexed within the host software.

This feature will lower costs of tbe system by cutting down on the number of lines, data sets and mainframe ports, the Pacific Telephone spokesman said.

Tran Building Hardware

Hardware for the network nodes at the college campuses is being built for Bell by Computer Transmission Corp. (Tran). Initially each campus will have a time-division multiplexer (TDM) and minicomputers equipped for both circuit and packet-switching.

The terminals used for the time-sharing application will be interactive teleprinters, while the remote batch terminals will have the capabilities of a 360/30 workstation.

The time-sharing traffic will have network priority over the batch traffic so when time-share volume is high, transmission speeds for the batch traffic will drop. But when time-share messages drop off, batch speed will pick up to the maximum allowed by the modems.

This dynamic resource-sharing capability will be built into the network, the spokesman said. Maximum transmission speed in the network will be 3,600 bit/sec. Data sets will be supplied by AT&T.

Pacific Telephone will purchase the Tran equipment and will then install and maintain it just as though it were Bell hardware.

Although the first customer is the state university system, the network is being built for the California Department of General Services.

Depending on the traffic characteristics and available resources on this first packet-switched network, it may be possible to share resources with other state agencies. There are currently about 19 separate data nets being operated for the state agencies, he said.

The second packet-switched customer for Pacific Telephone will be the Department of Transportation. But in this network, the demultiplexing will be handled by the Bell network switch and will then be transmitted in conventional format to the mainframe CPU.

For Synchronous Data

EDS Has 50,000 Bit/Sec Multiplexer

IRVINE, Calif. – A multiplexer that allows reception and transmission of synchronous data at speeds up to 50,000 bit/sec has been developed by Educational Data Systems (EDS).

Designated the EDS-302, the synchronous multiplexer is an add-on card for the company's EDS-8 programmable data channel multiplexer for Data General Corp. Nova minicomputers. The EDS-302 port card expands the capability of the EDS-8 to include eight synchronous channels in addition to as many as 120 asynchronous channels.

The EDS-302 synchronous channels can each receive and transmit data at any rate (up to 50,000 bit/sec) selected by a system modem. The EDS-8 is compatible with the Advanced Data Communications Control Procedure (ADCCP) as well as Synchronous Data Link Control (SDLC) and Higher-Level Data Link Control (HDLC) protocols, the firm said.

The flag sequence, zero-bit insertion and extraction and the frame-check sequence are all implemented in hardware. The EDS-8, including the EDS-302, permits each channel to operate in an automatic buffer mode for operation through the CPU's DMA channel.

Buffer Mode

In automatic buffer mode, character strings are transferred via the data channel into or out of buffer areas in core memory. The size and location of the buffers is under software control. Thus, entire message frames can be transmitted or received without any interruption of the computer program, the company said.

The EDS-302 hardware also generates and checks the Cyclic Redundance Check (CRC) code.

All data and control lines operate in accordance with EIA Specification RS-232C, in either full- or half-duplex modes. There are three outgoing data set control lines (Request to Send, Data Terminal Ready and Secondary Request to Send) under program control.

The EDS-302 makes available to the programmer five incoming data set control lines (Clear to Send, Data Set Ready, Ring Indicator, Received Line Signal Detector and Secondary Received Line Signal Detector).

With the EDS-302 card, users can obtain up to 128 multiplex channels combining both synchronous and asynchronous communications. The cost of the card with eight synchronous channels is $3,600. A two-channel version is $1,200.

The total cost of a complete EDS-8 multiplexer system including eight asynchronous channels, two synchronous channels, all necessary cables, connectors and junction panels as well as power supply, is $4,430. Delivery is 30 days from 17981 Sky Park Circle, 92707.

Bell to Offer Packet-Switching?

NEW YORK – The Bell System was recently reported to be considering the introduction of an interstate packet-switched service for data communications users.

An AT&T spokesman said he knew of no specific plans to inaugurate such a service, but added packet-switching technology is certainly one of the areas being considered along with others.

Bell Laboratories reportedly is analyzing the potentials of a packet-switched offering by the Bell System telephone companies.

While there are no technical drawbacks to introducing a packet-switched service onto the phone system, AT&T is evaluating whether it is willing to allocate the manpower to such a project on a nationwide scale, according to one industry source.

A Bell packet-switched network would not replace the present Dataphone Digital Service (DDS), but would provide a second alternative for data users, the expert said.

IBM Introduces 3777

WHITE PLAINS, N.Y. – IBM has added a remote-job-entry (RJE) terminal to the 3700 family that includes a 1,000 line/min printer. Called the 3777, the terminal is the first in the line to use the 3203 printer.

The 3777 includes a keyboard/card reader console that incorporates a higher speed model of the 2502 card reader operating at 400 card/min. Other readers are available.

The faster printer is a separate unit attached to the console by a cable. It can operate at 1,000 line/min using a 48-character print set or it can operate at 870 line/min with a 60-character print set, IBM said.

The 3777 can transmit data to an IBM 370 at speeds up to 9,600 bit/sec using IBM's Synchronous Data Link Control, the firm said. The unit can also operate with a 360 using 2770/3780 binary synchronous communications (BSC) at speeds up to 9,600 bit/sec.

An optional SDLC/BSC switch control is available for users with both types of lines and costs $27/mo on the 24-month Extended Term Plan (ETP) or $32/mo on monthly rental. Purchase of the switch feature is $1,080.

A typical 3777 including BSC, 9,600 bit/sec driver, EIA interface and 2502 card-reader attachment with the 400 card/min capability and printer costs $1,565/mo on ETP, $1,790/mo on monthly rental or $60,670 purchase.

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849 851	1316 —	2311 —	23111 854	100	1100	7.25
869 871	2318 —	2314 —	23141 841	100	2200	29.2
873	—	—	23142	200	2200	60.0
878 storage module	—	—	9780	200	6080	40.0
877	—	—	9762	400	6060	80.0
879 881	3336 —	3330 —	33301 844	200	4040	100.0
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CONTROL DATA CORPORATION

Disk Operates as Terminal Peripheral

SANTA ANA, Calif. – Serial RS-232 read-only memory (ROM) programs are available for operating the Applied Data Communications Series 62 intelligent floppy disk as a terminal page storage system or as an on-line disk storage system.

As a terminal page storage memory system, nonintelligent or intelligent terminals can now have .25M bytes of random-access storage available in a page memory address mode with Model 62-130-161.

Data is entered asynchronously by character, or a full page of screen image characters may be transferred in a batch mode.

For on-line applications, the intelligent floppy disk responds to a command of start code, function, drive number, track number, sector number and stop code.

Data is transferred in 128-byte records. The host device determines the function – read, write or status request – and where on the disk the data is to be accessed.

The disk is described as IBM-compatible with 77 tracks and 26 sectors of 128 bytes each. Average access time is less than .5 sec to any sector or page.

The on-line RS-232 program accommodates up to eight disk drives by specific address, while the terminal-oriented program accommodates up to eight disk drives by added page numbers.

Page capacities are customer-selectable in multiples of 128 characters. Popular sizes are 1,920 characters (15 sectors), 3,328 characters (26 sectors) and 1,644 characters (13 sectors).

Price for the Model 62-130-161 is $4,250 complete. A dual drive system Model 62-132-161 is $5,450 from 1509 East McFadden Ave., 92705.

Receive-Only Model

Extel Has 30 Char./Sec Printer

NORTHBROOK, Ill. – Extel Corp. has introduced the Model AH-11-R 30 char./sec receive-only teleprinter with standard features that include type variations that can be selected on-line and built-in diagnostics that allow on-site determination of operating condition.

The terminal is controlled by a microprocessor and operates at a low sound level, Extel said.

Printing of an original plus two copies is provided with a choice of standard teleprinter paper with ribbon or with coated (ink-encapsulated) paper – either available in 8-1/2-in. width.

The printer offers upper- and lower-case, expanded and bold-face and underlining. Continuous short-line printing is accomplished without the need for fill characters.

Options include built-in modems of Bell 103-, 108- and 113-type; selective calling for the most widely used 5/6/8 level codes; a 20-character answer back; page formatting for document filing; and special-character sets, including lower-case type with descenders.

The terminal costs $1,480 and is also available on various lease plans from Extel at 310 Anthony Trail, 60062.

Terminal Transactions

Lear Siegler Releases 'Bare-Bones' CRT

ANAHEIM, Calif. – Lear Siegler, Inc. has introduced a 12-in. "bare-bones" video terminal, the ADM-3LC.

The terminal offers a standard 960-character display in 12 lines or 80 upper and lower case characters. It also has an optional 24-line, 1,960-character display.

In applications now using teletypewriters, the ADM-3LC is said to be software- and hardware-compatible and can be used for direct replacement of the teletypewriter, the firm said.

The standard 59-key office-type keyboard, with upper and lower case shift, permits generation of the complete Ascii set. The ADM-3LC displays upper and lower case in high-contrast characters in a standard 5 by 7 dot matrix.

Data entry is at the bottom line of the ADM-3LC screen. Advancing to a new line causes the entire data page to scroll upward, typewriter-style.

End-of-line is announced by an audible tone to alert the operator to go to the next line manually, Lear Siegler noted.

A switch panel next to the keyboard allows operator selection of the ADM-3LC operating mode, either full- or half-duplex. The transmit and receive speed is selectable from 75 bit/sec to 19.2 kbit/sec, the company said.

The ADM-3LC terminal sells for $1,095 and the optional 24-line display costs $250, the firm added from 714 North Brookhurst St., 92803.

Lear Siegler, Inc. ADM-3LC CRT

Diablo Adds Signals For Hytype II Units

HAYWARD, Calif. – Diablo Systems, Inc. has added optional "paper-out" and "ribbon-out" signals for its Hytype II serial printers.

The paper out signal can be programmed to either stop the printer or to notify the operator in time to resupply the unit before it runs out of paper, a Diablo spokesman said.

The ribbon-out feature signals when the unit is about to run out of ribbon. The signal can be used to either stop the printer or notify the operator.

The paper-out option costs $26, and the ribbon-out option $18 from the firm at 24500 Industrial Blvd., 94545.

Canadian Certification Program Allows Direct Connection to Nets

By Gordon D. Hutchison

Special to Computerworld

OTTAWA – Government industry cooperation has led to the formal introduction of a program to permit the direct connection of customer-owned telecommunications terminal equipment to the networks of federally regulated carriers in Canada.

The government has introduced a certification standard and released the details of the certification procedure for a limited range of nonnetwork-addressing devices. The program will go into effect Nov. 21.

Procedures for other types of terminal devices will be introduced after this initial liberalization of interconnection restrictions has been tested and the procedural bugs worked out.

A type-approval program has been designed, in which manufacturers, distributors and other suppliers submit their equipment for test and certification by the Department of Communications. Thereafter, persons or organizations owning the type of equipment certified can connect the equipment to the network without a telephone company-supplied coupler.

Couplers will still be required for unapproved hardware, and the restrictions against customer-owned equipment of the network-addressing type will continue to be in force.

Under the terms of the program four basic types of nonnetwork-addressing equipment can be type-approved for direct electrical or acoustical connection to the networks of federally regulated telephone companies.

The equipment so far includes mostly voice telephone equipment.

Although there are limited applications for DP purposes within the range of approved equipment, the groundwork has been laid for type-approval of more sophisticated terminal hardware, an industry source said.

Federally regulated telephone companies are Bell Canada, British Columbia Telephone Co. and Canadian National Telecommunications, which represent about 80% of all telephones installed in Canada.

Micro-Controlled CRT Has Plug-In Boards

OTTAWA – A data communications terminal from The Computer Communications Group of the Trans-Canada Telephone System is a microprocessor-controlled CRT unit featuring plug-in modular circuit boards which allow features to be added right at a customer's premises.

Vucom 3 can operate in a communications or in-house environment by means of switched or private lines. It is said to be compatible with Vucom 1 and, in addition, adds polling and buffering options for those users who have functional requirements beyond Vucom 1, but do not need the level of intelligence associated with Vucom 2, a spokesman said.

The basic unit displays 960 characters in 12 lines of 80 characters. The display expansion option provides a maximum of 1,920 characters in 24 by 80 format.

Vucom operates at switch-selectable speeds from 110 bit/sec to 9,600 bit/sec. To further expand the terminal's storage capability, a magnetic tape cassette recorder is available. Each cassette has a 50,000-character storage capacity.

The basic terminal will be rented at a monthly rate of $115 to $125, depending on geographic area served. Two-year contracts will be available.

Vucom 3 is also the first terminal the firm has offered for outright sale to customers. The basic sale price will range from $2,600 to $2,800.

Vucom 3 is supplied to the company by Control Data Canada Ltd.

Line Problems Explained

BURLINGTON, Mass. – A brochure from Intertel dispels some of the mystery surrounding the telephone line failures that can plague high-speed networks.

Of interest to 4,800 bit/sec and 9,600 bit/sec data network users, the brochure shows oscilloscope photos of transmitted data with various kinds of line distortion and explains how users can identify typical line degradation problems such as amplitude and delay distortion, harmonic distortion, noise and phase jitter.

The brochure is free from 6 Vine Brook Park, 01803.

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Mass Storage's Slow Acceptance – Part 1

Advances in Other DP Areas Explain Scant Interest

By David N. Freeman
Special to Computerworld

Some of the most prominent DP manufacturers, such as IBM, Control Data Corp. and Ampex in the past decade developed mass storage systems (MSS) capable of keeping approximately one trillion bits of data on-line.

But during this time, commercial users generally showed scant interest in MSS. There are several reasons for this lack of interest.

One was that disk drives were announced as fast as most installations could assimilate them.

Within the decade, IBM moved from its 2311 drive (7.25M bytes) to its 2314 (30M bytes), 3330 (100M bytes), 3330-11 (200M bytes) and – just recently – 3350 (317M bytes).

Other manufacturers have matched IBM in this respect, leading to an annual unit-cost decrease of 15% during the decade.

Another reason was that technology has kept magnetic tape competitive with disks for archiving and sequential-processing functions.

Tape densities have increased from 800 bit/in. to 1,600 bit/in. to 6,250 bit/in.

Although not so dramatic as disk capacity increases, this has served to maintain tape's supremacy for archival purposes.

With the rapid increase in the number of disk packs per installation, tape has become the standard media for backing up disk.

The unit purchase price for tape reels has remained in the $12 to $20 range, whereas disk packs have typically rented for $15 to $25 per month.

Another factor was that the need for a third level in the storage hierarchy was uncertain. Many of the largest on-line applications – airline reservation systems, savings bank depositor inquiries and military-type command and control support – require random-access response times of 3 to 5 seconds.

None of the MSS devices developed during the last decade has been able to meet this performance level when accessed by dozens of terminals.

Even today, no announced MSS device can store 10 billion bytes on-line with the capability of retrieving any 100-byte record at random in less than 5 seconds.

The only approach furnishing this capability has been a room full of disk drives, logically organized so active subfiles are located on different drives.

Although this approach is very costly in terms of hardware (often exceeding $50,000/mo rentals) and floor space, it has the advantages of substantial redundancy in all critical components – channels, control units, devices, power sources and human operators.

It also offers commonality with peripheral equipment for other functions, since the control program and most batch applications use the same type of disk drives for secondary storage.

In short, management of large numbers of disk drives bas become a routine operational need and – at most installations – has been addressed by installing 20, 50 or more spindles of a single standardized architecture

The trend toward distributed data bases is another reason users lack interest in MSS devices.

Besides the new large-capacity disk drives, the major manufacturers have developed small, inexpensive disks: cartridges containing one or two platters and floppy disks utilizing a plastic record actually touched by recording heads.

The cost of these disks has been brought so low that virtually all new minicomputers – business or scientific – use them for storage of programs and data files.

Unit costs for storing and processing business data on minicomputers like the IBM System/32, Burroughs L9000, NCR 399 and Philips P-350 are quite competitive with processing the same data at corporate computer centers on IBM 370/168s, Burroughs B6700s, etc.

Reliability Unknown

The fact that hardware reliability of MSS devices is unknown – hence worrisome – and adequate file organization support may be years away is another reason users are not very attracted to MSS devices.

IBM delivered a precursor MSS device – the Data Cell – a decade ago which was unsuccessful in many respects.

IBM's competitors brought out functionally similar devices such as RCA's Race file and NCR's Cram file, which were little more successful.

Installation managers now are wondering whether the new MSS generation will experience these same problems of market acceptance and reliability or whether IBM and its competitors have learned how to field-maintain and software-support their MSS entrants.

Freeman is a senior associate at Ketron, Inc. in Wayne, Pa.

Part 2 of this series will outline the type of user installation that could effectively use a mass storage system, describe current mass storage equipment and suggest when an installation might want to convert to mass storage systems.

Workshop Planned

KING OF PRUSSIA, Pa. – The IEEE Computer Society's Second Mass Storage Workshop has been scheduled for Jan. 27-28 at the Sheraton-Valley Forge Hotel here.

Format of the workshop includes a plenary session on the first morning, round-table discussions that afternoon, progress reports by mass storage system manufacturers and users in the evening and additional round-table discussions the following morning.

Focus of the workshop will be on software support and maintenance of forthcoming mass storage systems, how to migrate to mass storage from tape/disk systems, reliability and backup procedures, media standards and how to share mass storage among several mainfrsmes.

Further information is available from Chairman David N. Freeman at 530 E. Swedesford Road, Wayne, Pa. 19087.

Lundy Micr Bank Data System Provides Variety of Sort Patterns

GLEN HEAD, N.Y. – Lundy Electronics & Systems, Inc.'s Micr satellite bank data system is a turnkey product that can provide a variety of sort patterns, totals, subtotals and differences, according to the vendor.

Called the System 970, the product also offers optional communications to a remote mainframe.

The 970 can perform multimedia processing via key-to-cassette and key-to-tape devices for file maintenance, loan applications, trust department records and reports, Lundy said.

The system also offers accumulation, formatting, report reception and printout and cash letter generation, the company added.

The System 970's reader/sorter processes 750 document/min; its magnetic tape unit produces 7- or 9-track, 800 bit/in. or 7-track, 556 bit/in. output. Its line printer can generate 400 line/min.

CMC-7, OCR-A-1 or OCR-B font recognition are optional, as is a 600 line/min printer, a 1,600 bit/in. tape unit and additional memory for the 8K minicomputer that drives the system.

Lundy System 970 Reader/Sorter

Standard software includes device drivers for each peripheral; Micr sort modules that control pocket selection on the reader/sorter; application modules to format data and generate totals; and communications modules that link the system with various CPUs.

Lundy is also offering tape-to-print, cash letter generation and keypunch simulation modules and will modify its software to suit a user's needs, the firm indicated.

The System 970 costs $85,000 and leases at $1,725- to $2,200/mo. The firm is located here in Glen Head, 11545.

STC Has 370/158 Add-On Memory

LOUISVILLE, Colo. – Storage Technology Corp.'s (STC) 3758 semiconductor add-on memory for IBM 370/158s offers 4K-byte chip design, maintenance aids and lease plans for users of purchased machines, an STC spokesman said.

Built by National Semiconductor Corp., the memory is designed to boost 370/158 storage in increments 512K to a maximum of 4M bytes.

The 4K-byte chip design offers reduced heat and power consumption and increased reliability compared with 1K-byte memory units, a spokesman said.

Maintenance aids allow the user to monitor bit failures during operstion and isolate faulty bits within an address, the spokesman added.

The 512K-byte memory module can be disabled or reassigned within an addressing scheme, the company said.

The memory units sell for $157,200 plus maintenance or lease at $3,500/mo including maintenance from the firm at 2270 S. 88th St., 80027.

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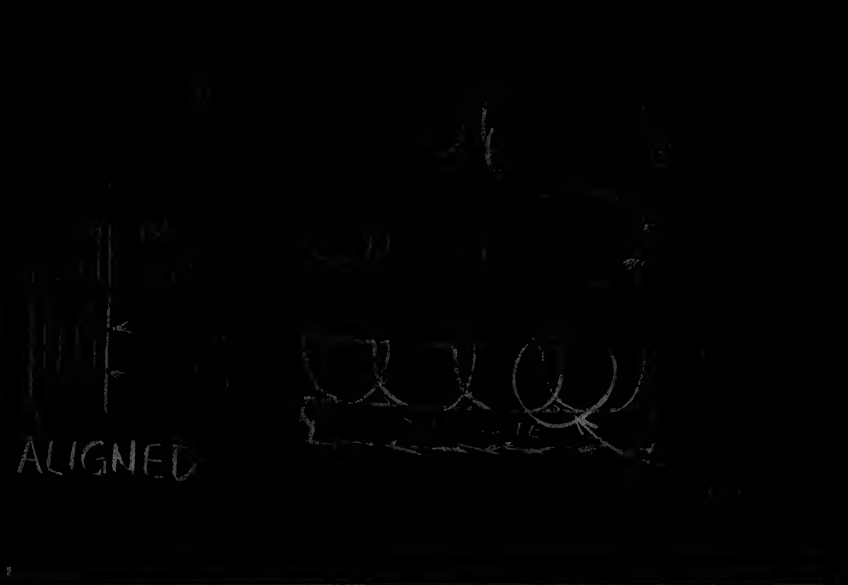

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MEMOREXPERIENCE

On-Line Retrieval Solves Parts Problems

CORRY, Pa. — Knowing the latest status update on a single custom-designed part is essential to the operations at McInnes Steel Co., and a computer is giving it that information.

McInnes is a medium-sized plant that specializes in the forging and manufacturing of a variety of parts, including those for nuclear applications, which may require up to 50 weeks for completion.

"An entire multimillion dollar project may be held up waiting for an important component we are manufacturing," said Stephen S. Fogle, DP manager, "but some parts, especially for our nuclear equipment customers, are extremely complex and require tests and operations taking days or weeks.

"We may check at one time and find a part is two weeks behind schedule and then check five minutes later to discover the expediter has updated the status and moved the schedule back onto the correct line," he noted.

For this reason, McInnes' real-time computer input and output system is a must, Fogle said.

The move into computerization was not without its obstacles, Fogle noted.

"Our plant is a compact one, and we had little choice as to where we could set up the computer room: we were forced to place it directly above the forge which shakes the entire building when it's in operation," he said.

"We were quoted $12,000 by one firm to install floating floors that would eliminate the vibration. Fortunately, we hit upon using special shock mounts under the equipment that isolates the computer from the shaking quite well," he said.

The shock mounts cost about $28 each and totaled less than $300 for the whole McInnes computer array. Fogle noted vibration is certainly not affecting the NCR Century 101, as he has had only 18 hours of on-line downtime in two years.

The system is run dedicated on-line from 7:30 a.m. to 5:00 p.m., with some batch processing done by a night operator.

During the day, however, a large number of transactions are carried out as the expediter brings up reports of progress made on individual orders. Also, all new orders, new operations and their maintenance are done during the on-line day.

The information is entered by means of NCR 796-201 CRT video terminals, rated at 4,800 bit/sec. Six are available at the McInnes plant, both for entering data and retrieving it as needed.

Portable Terminals Added

"To eliminate tying up the inside men with the relaying of long, often complicated reports, we have recently added two NCR 260-5 portable terminals, which can be put on-line with the Century 101 by means of an ordinary telephone line.

The salesman effectively has a complete computer tie-in. This allows him to request data which is printed out by the terminal at the rate of 30 char./sec.

"No video referencing is available from the portable terminal, which is contained in a compact, small-suitcase-sized case," Fogle noted.

As soon as the computer has a status change entered, it is available to anyone with access to one of the eight in-house or portable terminals, he emphasized.

McInnes also supplies its customers with regular status report printouts which show clients all of the jobs it currently has at the company, how each is progressing and projected completion date. These reports contain both McInnes and customer reference numbers, salesman's name, price and other data.

McInnes also is using a program that allows the computer to compute standards for machining parts as well as determining which machine is best to do the job, he commented.

"We can supply the computer with information on all the jobs that are available, the specifications and schedule needed," Fogle explained.

"It can take into account the capabilities of each different machine that might be able to handle the jobs — minimum and maximum sizes, speeds, feeds and so forth — and determine which machine we should use for maximum efficiency," he said.

With specifications from McInnes engineers, the computer also determines and prints out the exact standards to be used to produce a piece.

"Because the computer is doing the job, we always calculate standards the same way. Thus, the workman can look at the recommendations and then immediately see that his own individual working style would complete the job faster another way than the one recommended.

In addition, if we need to switch a job to another machine at the last minute we don't need to recalculate standards — they are available from the computer," Fogle noted.

Though classified as a job shop, 50% of McInnes' workload is in repeat orders. For these, the computer can also be used to recalculate prices, to reflect increased material costs or other factors that have changed.

In the future, Fogle is looking toward using a data base inquiry system with a 128K Century 101.

"This will eliminate a lot of the one-time programs we have to write," he explained. "The president of the company may come down and want to know how many of a certain type of job we did last year. I've either got to give him a whole dump to look through or else write a one-time program to allow us to get that specialized data.

Fogle said he hopes to put the plant's steel inventory on-line in the near future, as well as steel certifications and bills of lading. Still another improvement will be the hooking up of a large-format television monitor to one of the CRT terminals to allow viewing of the larger screen-size computer output in McInnes' conference room.

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CONTROL DATA CORPORATION

Airline Unites Approaches to Simplify Data Entry

ELK GROVE TOWNSHIP, Ill. – A small data entry staff at United Airlines here has managed to convert a number of complex on-line data entry applications to key-to-disk gear.

United has a huge data entry requirement in terms of both volume and complexity of data. Passenger and freight revenue accounting is made particularly complex by the large number of rates and tariffs, special fares, interline ticketing, agent commissions and government regulations.

Until recently, five different types of data entry equipment were used at United – key-to-disk systems, keypunches, typewriters with optical scannable font, Four-Phase Systems, Inc. CRTs on-line to the IBM 360 under Customer Information Control System (CICS), and IBM 2260 CRTs.

United wanted to standardize data entry equipment, but retain the sophisticated editing accomplished with the on-line CRTs. The airline chose 11 Four-Phase System IV/70s with about 120 operator stations using Data IV/70 data entry software provided by Four-Phase.

Data is keyed to disk, then output to magnetic tape. Tapes are transferred manually to the mainframes located in the same building.

Patch Panel

A patch panel allows any operator station to be switched into any of the 11 processors, providing flexibility and backup for the operators. Ten processors are used for production work; the 11th is for backup.

United's data entry department uses some 280 unique multiformat jobs, of which 25 are major.

The jobs include passenger revenue accounting in which data is entered from passenger tickets lifted at the airport, processing air freight waybills and sales accounting of data entered from tickets sold by United or its agents.

Jeff Jerome, United's supervisor of data entry support, led the equipment evaluation and implementation effort. His main criteria were equipment flexibility and suitability to the data entry department and the elimination of costly edit runs.

In addition to cost savings, he had to consider the impact of equipment on a 300-employee department operating three shifts a day. As a result, human engineering aspects of the equipment, ease of application formatting and flexibility were important selection criteria.

Jerome had another requirement. United's revenue accounting system has evolved over 10 years into one allowing the operator extensive judgment at the time of data entry.

The operators are trained to look at a ticket and make a judgment on what data must be entered and in what order.

As a result, United developed a free-form area for input where the operator could enter coded information in any order. These applications previously were handled from the mainframe via on-line CRTs. Jerome didn't want to sacrifice input flexibility.

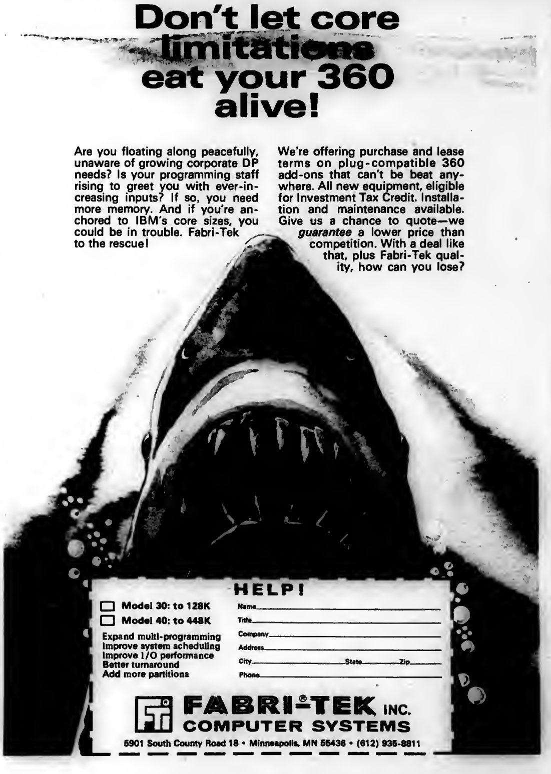
The Data IV/70 language offered the capability to validate the free-form entries. Free-form data entry yields throughput improvement over a fixed-field approach, where many fields are blank.

"We really haven't had an edit routine that we weren't able to perform with Four-Phase software," Jerome said.

All applications were coded and implemented by Jerome's three-employee staff. As they are located right in the data entry department, changes in formats can be implemented at once, an important consideration in an environment of constantly changing specifications for many applications. Jerome's staff uses the Cobol capabilities of the Four-Phase systems to perform statistical work, eliminating the need to go the DP department for special programs. A Four-Phase Cobol program was written to analyze data entry performance statistics that are produced by Data IV/70.

This program prints special reports used by the data entry staff. Jerome is developing an RPG program that will be used to perform quality control on selected batches of data.

Certain batches will be entered twice by separate operators. The RPG program will analyze the batches and flag those that do not match.



COM Seminar to Mark Caravan Stops in '76

NEWTON, Mass. – A seminar on "COM – Optimizing Computer Output" will be conducted by the Computer Image Processing (CIP) Division of the National Microfilm Association at each Computer Caravan city next year.

CIP's main purpose in joining the Caravan with this free seminar is to "spread the good word" about computer-output microfilm (COM), Frank Hinkle, incoming president of CIP, said. The seminar will address concepts and applications rather than specific equipment.

Following CIP's seminar, individual COM vendors will conduct separate exhibitor seminars. Information in the exhibitor seminars will cover much more than just equipment descriptions, Hinkle said.

"The vendors will stress applications, because that's the type of thing the person who comes to the Computer Caravan is interested in," he said. "They want to know about applications, how to make a COM study, how to justify COM equipment and how to use it."

The Computer Caravan, which is sponsored by Computerworld, Inc., will begin in Boston March 2 and then travel to New York; Washington, D.C.; Atlanta; Detroit; Chicago; Dallas; Los Angeles and San Francisco.

Carrying Bound Printouts Eased With Free Handle

ELIZABETH, N.J. – Boorum & Pease Co. will include a free slip-on/slip-off Datatote handle for 14-7/8-in. unburst DP printouts with orders for 10-packs of the company's N-32-14 series binders.

Made of molded plastic, the handles give briefcase-like carrying ease to bulky binders, the company said.

The 10 binders cost $24. Additional Datatote handles sell for $1.25 each from the firm at 801 Newark Ave., 07208.

Honors Cash, Credit Cards

Mini Manages Self-Service Gas Pumps

ANAHEIM, Calif. – Drivers stopping to "fill 'er up" here are finding their friendly service-station attendant has a new helper – a computer.

That's the case at a number of Arco service stations here, in Los Angeles and on the East Coast.

The Anaheim facility is typical of all the installations – a computer-controlled self-service station opened by Atlantic Richfield this past year. It is an entirely new dimension in convenience operation, providing the maximum in speed and efficiency, a spokesman for the oil company said.

The system, which was designed and manufactured by Docutel Corp. in conjunction with Atlantic Richfield, consists of three terminals, each of which monitors six fuel pumps and has a customer input panel.

Controlled by a Naked Mini minicomputer, manufactured by Computer Automation, Inc. of Irvine, Calif., the system handles all credit card or cash sales, the dispensing of fuel and the printing of a detailed receipt – activities normally accomplished by a station attendant – while providing numerous safeguards for the customer.

What's more, the system also provides a detailed printout of all transactions completed during the day, showing the type and amount of gas pumped. This enables both dealer and distributor to continuously monitor inventory.

Operates With Card, Cash

The system operates with any Atlantic Richfield credit card – or, if a customer is old fashioned, it'll take cash.

When using a credit card, a customer drives in, leaves his car and inserts his card into the control terminal on the pump island. The control panel is connected to the Naked Mini at the station, which in turn is linked by a telephone circuit to Atlantic Richfield's credit card center in Atlanta.

Once activated, the minicomputer performs a verification check to assure that the credit card is valid and that the bills have been paid on time.

The electronic verification procedure ensures only the person to whom the credit card is issued can use it. A list of bad accounts and stolen credit cards is maintained in Arco's credit card center in Atlanta and is checked each time a transaction takes place. If a card matches a number on the list, it is captured by the system.

The process of credit checking takes only a few seconds. Once the account has been verified, the customer pushes a button to select his fuel, grasps the fuel nozzle and pumps his gas. Along the way he is guided by simple instructions displayed through a window on the control panel.

When the transaction is complete, a receipt is issued containing information such as date, time of day, amount of purchase, type of fuel, price per gallon and number of pump.

In addition to credit cards, purchases can be made with cash by simply inserting dollar bills into a slot in the terminal. If $3 is inserted and only $2 worth of gas is pumped, a refund authorization is printed and handed to a human attendant who makes change.

"During initial development, we became involved in a thorough analysis of the system to find a design that would be easily understood and accepted by the public," Bill Fuqua, marketing vice-president for Docutel, said.

Performance demonstrated the public does accept the system, he said. In fact, they seem to enjoy using it, possibly because the average service station attendant requires 10 to 15 minutes to complete a normal transaction, while a cutomer can do it himself in less than 3-1/2 minutes and be on his way, Fuqua added.

This computerized service, coupled with inherent inventory control, not only speeds the flow of traffic through the station, but also lets the station and central distributors know the status of the gasoline supplies on hand and when to reorder.

French IBM 115, 125 Submodels Introduced; Unavailable in U.S.

PARIS – The IBM System/370 Model 115-2 and Model 125-2 were recently introduced by IBM World Trade Euope/Middle East/Africa.

The expanded models aim at increasing the range of applications into data base/data communications, for example – by boosting processor speed and on-line disk capacity, IBM said.

The announcement includes, for the Model 115-2, a memory of up to 256K bytes, plus a faster multiplexer channel. Both new models have an increased instruction execution rate, the firm said.

The number of attachable IBM 3340 disk storage drives is doubled to eight spindles for the 115-2 and to 16 for the 125-2, and string switching between processors has been introduced.

A cardless system is now available with diskette as primary I/O medium.

French prices for the 115-2 configuration with 64K and the expanded features are 1,011,033 francs ($231,527) compared with 750,332 francs ($171,826) for the earlier 115 with 64K.

The French price of the 125-2 with 96K and the expanded features is 1,448,676 francs ($331,747) compared with 1,245,081 francs ($285,123) for the earlier model with 96K.

In Germany, meanwhile, *Computerwoche* reported monthly rental of the 370/115-2 with 160K of memory comes to 16,000 marks, or approximately $6,250.

First customer shipments are scheduled for April on the 115-2 and February for the 125-2. The systems are not available in the U.S., the Americas or the Far East at this time.

Modcomp Users Forming Group

FORT LAUDERDALE, Fla. – Users of Modular Computer Systems, Inc. (Modcomp) minicomputers are invited to join an independent user's group.

Designated Modcomp Users Exchange (Muse), the group currently being formed will hold its first formal meeting on Dec. 11 and 12 here.

The purpose of the group, according to Kenneth Wiley of Lawrence Berkeley Labs and acting president of Muse, is the promotion of the research and development of ideas and information related to computers and computer science for the benefit of its members and the public.

In addition to Wiley, other officers elected to serve until the first full election at the December meeting were: Pat Hughes of Community Health Computing, vice-president; Linda Deveau of Massachusetts General Hospital, Treasurer; D'Arcy Randall of Standard Oil of Indiana, Secretary; and John Moore of Saint Vincent's Hospital in New York and Bruce Meyer of Cornell University, both elected at-large delegates to the board of directors. Edward Marinaro, head of Modcomp marketing, was selected to represent his company on the board of directora.

For additional information regarding membership, contact Muse International, Modular Computer Systems, Inc., 1650 W. McNab Road, 33309.

System Counts Votes

BERKELEY, Calif. – Computer Election Systems (CES) has developed a minicomputer system that will both maintain voter registration files and process ballots.

The system is based upon a Hewlett-Packard (HP) Model 2125 Discomputer.

The system is CES's first venture into computerized voter registration data bases. Previously, the company has marketed three types of vote-counting machines in conjunction with its Votomatic vote-recorder line, presently being used by 15% of the nation's voters, the firm said.

The basic system is priced at under $100,000. It includes the Model 2125 Discomputer with 32K core and 15M byte disk memory, a ballot card reader, printer, and two HP Model 2640 CRT terminals.

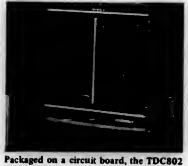
Unit Links Nova, Calcomp Drives

MOUNTAIN VIEW, Calif. – A controller linking California Computer Products, Inc. (Calcomp) Trident disk drives with the Data General Nova and compatible minicomputers has been announced by Minicomputer Technology (MT).

The TDC802 controller is a self-contained interface for all Data General Nova and compatible computers, including the Eclipse, and the CPUs made by Digital Computer Controls (DCC) and Keronix, Inc., MT said. The controller requires one CPU slot and cables directly to up to four Trident drives.

Standard features include DMA data transfer, full-sector buffering, hardware check sum calculation, dual access, automatic bootstrap capability, rotational position sensing and overlapped seeks. A light-emitting diode (LED) logic probe is built in to assist in servicing.

The controller costs $1,900 from the firm at 1901 Old Middlefield Way, 94043.



Packaged on a circuit board, the TDC802 controller slides into Nova CPU chassis.

MMI Adds Micromini

SUNNYVALE, Calif. – MMI/Systems, the OEM computer systems division of Monolithic Memories, Inc. here, has introduced the Micromini System 300, a 16-bit microprocessor that has instruction execution time of less than 1 μsec, the firm said.

The System 300 CPU is available in two operating performance ranges. The 301 CPU ($1,250 in unit quantities) allows instruction execution time of 900 nsec, and the 304 CPU ($625 in unit quantities) has an execution time of 1,800 nsec.

Read/write memory elements for the system are either 4K 16-bit-word stand-alone memory blocks or a pair of cards based on 4K-bit dynamic random-access memory (RAM) devices.

Peripheral interfaces are available for teletypewriter, paper tape reader/punch and RS-232 channels. Future plans include both floppy and hard disk controllers, according to the firm at 1165 East Arques Ave., 94086.

On DG 6012 CRTs

Program Set Allows Full Screen Use

FORT LEE, N.J. – Data General Corp. (DG) 6012 display terminals, positioned as a teletypewriter replacement, can now provide readily usable, full-screen capabilities as the result of a program set developed by Systems RDI Corp. here, Systems RDI said.

With this package, DG users can access the entire screen for both input and output. CRT.LB operates in Page mode under Rdos on Nova and Eclipse minicomputer series and requires the screens be full-duplex.

CRT.LB provides a full set of I/O instructions specifying screen starting location for the transfer and transfer length.

Data is input to the program and output from the program in standsrd A2 format. The package will output any Ascii string, whereas the input package has four entries: alphabetic (A to Z); string (space and all displayable characters); integer (0 to 9); and dollars and cents (0 to 9 plus comma and period symbols).

In the case of dollars-and-cents input, commas are accepted as valid input characters, but are not displayed. Decimals are displayed, so the underscore string printed is one character longer than the length specified. Neither decimals nor commas are transferred to calling programs.

Alphabetic and string input is transferred to calling programs as input, blank filled. Integer and dollars-and-cents input is right justified, zero filled.

On all input the cursor is under complete computer control and will not respond to operator cursor commands. Similarly, commands such as CLEAR, TRANSMIT and the like are ignored.

Input Errora

Input format errors are automatically treated by the system. The bottom line of the screen is reserved for error messages. When a set of characters of length longer than requested is input, the input field will revert to underscores and the input characters will appear within brackets at the left of the bottom line followed by a blinking message, "too long."

In the case where noninteger, nonalphabetic or non-dollars-and-cents data is not acceptable based on the calling sequence and is input, the entire field, including the offending characters, will be treated in the same way as the too-long case, with the appropriate message blinking.

The package is available under license for a one-time fee of $3,000. A DG formatted library file, CRT.LB, will be provided in dump format on paper tape along with user documentation and calling sequences.

An option available to users of CRT.LB is the FMTIN and FMTOUT set. FMTIN operates as a stand-alone program and allows the user to sit at a screen and key in any screen format desired, including control characters. Upon completion of the format input, a format number will be assigned and displayed by FMTIN and the format will be stored on disk.

FMTOUT operates under Rdos and displays the format on the appropriate CRT screen, when called, giving the format identification number (assigned by FMTIN) and the appropriate Rdos CRR channel number.

The price for FMTIN/FMTOUT under license is a one-time fee of $1,000 from the firm at 2460 Lemoine Ave., 07024.

Order Entry Flows Like Wine Using DP-Based Warehousing

An operator of the automated distribution aystem at Gallo Sales Co. monitors the flow of thousanda of ordera each evening using a Hewlett-Packard 9603 industrial measurement and control syatem.

SAN FRANCISCO – A minicomputer is speeding the flow of wines from cask to consumer at a wine distributor in Northern California.

Gallo Sales Co., an independent company that distributes U.S. brands and imported wines is using the recently installed system to control a complex material-handling system that fills thousands of orders daily.

The computer, which has already reduced costly overtime and order-filling errors, has helped the company locate mechanical problems inherent in the material-handling system.

It is also helping to prevent system breakdowns by indicating which mechanical elements are not operating within tolerances.

Called Computerized Order-Picking Equipment Systems (Copes), the system uses a Hewlett-Packard (HP) 9603 industrial measurement and control system situated in offices adjacent to the warehouse to select the ordered wine from rows of cases of stock. The system then controls their flow through an intricate maze (more than two miles) of both gravity and powered conveyors to the delivery trucks.

Accuracy a Benefit

Paul Anderson, operations manager of Gallo, said the most significant benefit is accuracy. Under the earlier, semiautomatic system without the computer, the company could expect about 60 errors in orders every day.

"Already, errors have been reduced by about 50%," Anderson said, predicting it would eventually cut 99% of the errors.

Computer software for Copes was designed and implemented by Virtual Memory Systems of Orinda, Calif.

The process begins with the salesperson taking the order from the retail store. It is entered the next day into a remote IBM 360/40. This computer then makes the necessary accounting and inventory tabulations and generates a magnetic tape which becomes the input to the Copes system.

The magnetic tape containing the day's orders and route information is delivered daily from the computer center to arrive here before 4:00 p.m. when order filling and truck loading begin.

The tape is read onto the HP 7901A disk drive using an HP 7970B magnetic tape transport, and the order filling begins by the controlled opening of three tiers of escapement gates and the automated starting and stopping of conveyors.

All the warehouse equipment is activated by signals received from the computer through an HP 6940A multiprogrammer, a programmable, bidirectional digital multiplexor.

When signaled by the computer, the HP 6940 sends a 15-volt signal through any of 84 solid-state relays which operate the electromechanical devices in the system.

A feedback 15-volt signal acknowledges the action has taken place. The escapements allow one case at a time to slide onto the high-speed conveyors.

As each case is released from the escapement on its way to the loading docks, it is scanned by a photo-electric control, and the count is reported to the computer, assuring the accuracy of the order and the spacing of cases on the belts.

When the order is completely picked, the computer continues to monitor its location on the conveyors. From time data in its memory, the computer knows when the order has moved far enough down the conveyors to permit the next order to be filled.

As orders flow to the truck, the next shipment is directed to the next truck by a three-way hinged conveyor divider. In this way, three trucks can be filled at the same time.

The computer also detects malfunctions of the mechanically operated devices in the material-handling system. It does this by measuring the time it takes for the device to operate once signaled by the computer to operate.

"The mechanical side of the system such as the conveyors and the escapements have been here for many years," Anderson said. "By now removing operator fatigue almost entirely and, with it, the human errors, the Copes system has helped us discover where the deficiencies in the mechanical system are, allowing us to make corrections."

The warehouse also contains a voice communications system with six terminals for communication between the system operator who oversees the order-filling process and the loading docks.

The operator views a video display terminal which shows him which orders are being filled and which wines they contain. Using this information and his override switches, he can control the system manually, should that become necessary.

The Copes system was programmed in Fortran on the HP 9603 computer which includes the HP 21MX processor.

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Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250

San Francisco	**Dunfey's Royal Coach**	**Jan. 19-20**
New York	**Summit Hotel**	**Feb. 23-24**

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

San Francisco	**Berkeley Marriott**	**Nov. 10-11**
New York	**Essex House**	**Jan. 26-27**

Data Base Design

Given in association with Leo J. Cohen and Performance Development Corporation, this three-day seminar is a package-independent examination of the techniques required for the design of effective data base systems. The seminar covers Effective Record Design, Physical Storage Techniques, Optimum File Organization/Indexing Techniques, File Integration, and much more.

Cost for the seminar, including course materials, continental breakfasts and luncheons is $350. Additional registrants from the same company qualify for a reduced rate of $300.

Denver	**Denver Hilton**	**Dec. 1-3**

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

New York	**Summit Hotel**	**Oct. 22-24**
San Francisco	**Hyatt Regency San Francisco**	**Nov. 12-14**
Chicago	**Hyatt Regency O'Hare**	**Nov. 19-21**

Data Communications Course #1010 – Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

Dallas	**Hilton Inn**	**Nov. 10-11**
Miami	**Marriott Miami Beach**	**Nov. 17-18**

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications networks. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of customized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400.

Miami	**Holiday Inn Airport Lakes**	**Dec. 1-3**

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COMPUTER INDUSTRY

CI Notes

R2E Finds U.S. Associate

SOLON, Ohio – Realisations Etudes Electroniques (R2E) of Paris, France, has signed Warner & Swasey Co. as the exclusive manufacturer and marketer of its Micral microcomputer line in the U.S. and Canada.

The pact between the two firms occurred about a year and a half after R2E announced it was looking for a business associate in the U.S. [CW, April 10, 1974]. The Micral is built around the Intel 8080 chip.

Warner & Swasey is marketing its Micral-based small system for industrial DP applications such as eingineering data analysis, advanced accounting and inventory control systems as well as communications systems.

The firm also offers the Comstar System 4 and System 8 microcomputer lines, designed for industrial control applications.

Burroughs, Redactron Terms Set

DETROIT – Burroughs Corp. has reached a definitive agreement for the acquisition of Redactron Corp., maker of word-processor systems and a variety of components and peripherals for computers.

The terms give Redactron holders at least $7.50 worth of Burroughs stock for each share of Redactron held. With about 1.2 million outstanding shares, the transaction would be valued at about $8.8 million.

Valcomp to Acquire Quelex

CUPERTINO, Calif. – Two suppliers of maintenance and replacement parts for Xerox computers have agreed in principle to combine.

Under the proposed agreement, Tymshare, Inc. will acquire Quelex Data Systems, Inc. for an initial cash payment of about $1.5 million and additional payments based on the combined performance of the firm and Tymshare's Valcomp division over three years.

Quelex would become part of Valcomp, giving Xerox users a single source for service. In addition to service for Xerox users, the new firm would continue to provide parts and service for other makes of equipment as well, Tymshare said.

Supershorts

MRI Systems Corp. has signed a distributorship agreement with CJK Co., Ltd. of Tokyo to sell the System 2000 data base management system in Japan.

– – –

The Institute for Advanced Computation at the National Aeronautics and Space Administration's Ames Research Center has become the 900th member of the Western Electronic Manufacturers Association.

– – –

Computer Automated Products, a British firm which markets and supports Boole and Babbage products in Europe, has changed its name to Computer Program Products.

– – –

Caci, a management consultant and software group, has expanded its operation to Europe where it will specialize in consulting on data base and teleprocessing under the direction of Ian Palmer.

– – –

Microdata Corp. and Potter Instrument Co. GmbH of Vienna have signed an agreement covering sales and service of Microdata's line of magnetic tape transports and formatters in the European OEM marketplace.

But Supports Software Patentability

Adapso/SIA Asks Patent Case Dismissal

WASHINGTON, D.C. – Although the Association of Data Processing Service Organizations' Software Industry Association (Adapso/SIA) believes software should be patentable, the history of Dann vs. Johnston makes it an inappropriate vehicle with which to approach the Supreme Court.

In an amicus curiae, or friend of the court, brief filed here recently, the industry association urged the Supreme Court, which agreed to review the suit [CW, May 21], to dismiss the case.

However, if the court should consider the case, it should rule in favor of software patentability, the association said.

The writ of certiorari bringing the case to the court "should be dismissed as improvidently granted because of the inadequate record, the jurisdictional barrier to the reconsideration of a central factual issue and the inappropriateness of the principal question for which certiorari was granted," Adapso said.

The association observed the record does not provide the factual basis that would enable the court to undertake a thorough inquiry into the "complex technological issues of special-purpose computer construction" that would be necessary to consider what the U.S. Patent Commissioner presents as the key issues.

The most basic technological issue – the finding of the Patent Office's Board of Appeals "that programming a general-purpose computer restructures the computer into a different machine – is not jurisdictionally subject to review" because statutes bind the Patent Commissioner by the appeal board's determinations, the brief said.

The writ of certiorari, brought by the petitioner, C. Marshall Dann, Commissioner of Patents and Trademarks, was a "nonjusticiable intraagency dispute."

Dann petitioned the Supreme Court to hear the case after the Court of Customs and Patents Appeals (CCPA) affirmed the patentability of Johnston's program [CW, Oct. 9, 1974]. Previously the U.S. Patent Office had rejected Johnston's application for a patent.

Technological Equivalents

Turning to why software should be patentable, Adapso said "computer innovations embodied with stored computer programs are legally entitled to the same patent protection as innovations embodied in wire-connected electronic circuits, for technologically 'hardware' and 'software' are equivalent.

"The designer of software, like any engineer, builds machine structures, not methods of doing business; he develops machine solutions for machine problems," the brief said.

The basic issue in the case – whether programs are patentable – cannot be resolved by a decision in this case, Adapso continued.

"Whether a particular machine constitutes patentable subject matter depends on the well-established principles of patent law – not whether the machine is built with one form of construction (software) as against another (hardware)," the brief said.

"To base disparate legal treatment upon a mode of construction has no justification in law, technology or common sense," the brief continued.

"The facts that a programmed computer . . . is a machine and the innovative aspect of it is a machine structure cannot be overcome by petitioner's legal arguments," Adapso argued.

Adapso/SIA, which represents about 62 firms in the computer field, about 70% of which concentrate in the software products in industry, emphasized the importance of software protection to the health of the DP industry.

Copyright protection is "inadequate and inappropriate to protect innovative machine structures," the brief said.

"In a field dominated by IBM, the growth of the small independent software company has been stifled by the bundling practices of the hardware manufacturers," Adapso said.

Because of the lack of patent protection, the industry has been forced to rely on trade secrccy, which has deterred disclosure of innovations, Adapso said.

Two Mini Firms Enlarge Product Ranges

By Molly Upton
Of the CW Staff

"Damn the torpedoes – full speed ahead!" seemed to be the message from both Computer Automation Inc. (CA) and General Automation, Inc. (GA) as within two weeks of each other they unveiled their answers to possible incursions by the semiconductor houses.

Undaunted by the terminations, both quiet and thunderous, of their previous entanglements with advanced technology designed to lower the price/performance ratio, they have tried again. But the techniques differ.

GA, whose silicon-on-sapphire (SOS) chips, hailed as a well-proven aerospace technique, died a splashy death, has rebounded with custom LSI chips from Synertek, in which it has a financial interest.

The chips are modeled on the architecture of GA's SPC-16, which led Sam Lane to claim the microprocessor is at least twice as fast as anything on the market. Lane is marketing manager for GA's Computer Products Group.

These N-channel devices are faster than the SOS product, he said. Asked if GA wasn't burned by the SOS experience regarding custom work, he explained this is different.

The increase in yields is on an order of magnitude, and the relation with Synertek is different than that with Rockwell, its SOS supplier, since GA has an investment in the semiconductor firm.

But over at CA, which has "quietly buried" its LSI-1, based on a custom MOS chip, the new product line uses "off-the-shelf TTL components," President David H. Methvin said.

"We use technology for one purpose: to reduce the cost of the product," he explained.

The LSI-1 was never shipped. The yield was low and the chips were not interchangeable without some adjustment, he explained.

"It was a little embarrassing. It died a quiet death," he said.

Although the techniques differ, the motivations are very similar – to get a range of compatible products to market and make sure the bottom end of the range is priced well under $1,000.

"We have to have micros to protect our mini business," GA's Lane said. "Whoever gets a contract for micros will also get the mini order."

With CA's latest offering, the packaged Alpha 3/05, "minis have dropped to the threshold price of $700," Methvin said.

Both firms are stressing the upward compatibility of their lines and are extending their product ranges on the upper

(Continued on Page 34)

Methvin

CW Photos by M. Upton

Lane

CDC Forms Group, Sets Sights On Small, Distributed Systems

By a CW Staff Writer

MINNEAPOLIS – Control Data Corp., setting its sights on the small computer and distributed DP markets, has formed a new group to focus the company's resources on these areas.

Hugh Henig will head the Data Processing and Terminals Systems Group as vice-president and executive, reporting to Thomas G. Kamp, president of CDC's peripherals products business.

Henig had been vice-president and senior staff officer for product and services strategy since 1974. He was previously vice-president of the Service Bureau Corp. (SBC).

He will have operating responsibility for four CDC units engaged in the development and manufacture of small computer systems, data entry and other peripheral subsystems and computer terminals, the firm said.

The group's function is "to focus more efficiently CDC resources that develop small systems hardware and software of similar characteristics either as stand-alone products or subsystems used in distributed data processing environments," Kamp said.

Henig explained the move as "evolutionary" because none of the activities are new to CDC.

From a manufacturing, engineering and systems as well as marketing point of view, there is a lot of commonality in configuring small business systems, data entry systems and other peripheral subsystems, he observed.

In addition, CDC has been cognizant for some time of the increasing need to satisfy users by some means other than central-site processing, he said.

Henig acknowledged this new thrust could well lead to a new area of customers for CDC, specifically in the small systems area. The group will not immediately enter the small user market, but "I think we have a great deal to offer," he said, drawing upon knowledge of user needs gained from SBC and small systems expertise.

First, however, "the sales force needs to grow in size and understanding of requirements for small business users," he said.

GA, CA Extend Offerings In Minicomputer Range

(Continued from Page 33)

end as well.

GA announced its 440, which it said is a completely new machine in design and uses Schottky medium-scale integration (MSI). Lane said he expects it to replace the SPC-16/80 and 85.

"We felt we have gotten to the point where we can compete in the mega mini area," he said.

GA is experiencing high interest from customers at both ends of the product spectrum, Lane said. "Customers had felt constricted by the lack of our product breadth," he explained.

Solution Series

With its line of products ranging from the micro-based 16/110, selling from $531 in OEM quantities, to the 440 "maxicomputer," which costs $8,950, GA provides customers with a range of compatible products, Lane said [CW, Oct. 15].

CA has quietly formed a Commercial Systems Division as part of its recent reorganization and recently acquired rights to software written for its Megamini system. The system handles up to 24 terminals for on-line inquiry."

Methvin said his firm is being quiet now because "we don't want to turn on users and not be able to handle them." The firm is taking care to ensure that if a system goes into the field it can provide support for it, he said.

End of Two Eras

Although 1975 may be known as the year when both CA and GA buried their technological misadventures, it will also be known as the end of the recession for them.

Both firms reported business for the recent quarter was better than that of a year ago, when they began to feel the effects of the economy.

Business is up sharply at CA and the search for bodies is on.

Methvin said activity began picking up in May, but he didn't know if it was a blip in the economy or not. Now he feels it's definitely not a momentary blip, and he plans to increase the workforce by 90, which will make the firm bigger than its previous peak of 444 in July last year.

The demand appears to be across the board in industry sector and customer size, he said. "It's a nice healthy feeling."

Most order activity is for the Alpha 3/05; the bulk of shipments are for its 220, which he described as midrange. The bulk of business is in the low end of the line, but orders are also across the product line, he said.

The distributed I/O system is taking off, he added. Methvin considers it the second most important contribution CA has made to the industry. The first was the concept of the Naked Mini.

The market reaction to the distributed I/O product was delayed, he said. At first people couldn't believe it and said it was too cheap and suspected a

(Continued on Page 35)

CW Photos by M. Upton

Alpha 3/05s (left) await shipment; GA 440s at right are destined for the Bank of America for distributed processing in an electronic funds transfer system.

Fujitsu Made It Possible, Amdahl Says as 470 Bows

By Patrick Ward
Of the CW Staff

SUNNYVALE, Calif. – Without Fujitsu's help, "we would have been hard-pressed to come out with a large-scale computer in the time frame we did," Gene M. Amdahl said as his company introduced its IBM 370/168-compatible machine, the 470/V6, last week.

Amdahl, once manager of architecture for the System 360, said he founded his company because he saw room for a small independent to challenge IBM's large machines.

The 370/135 and 370/145 were the design center of IBM's line, he said. This cost-oriented commitment to a single technological pattern benefited the company's mid-range but made it harder for IBM to build the optimum large machine, he said.

Amdahl also felt the typical large-machine user had enough in-house expertise to be independent of any one vendor.

When Amdahl Corp. was launched five years ago, "it was a challenge to develop a CPU of that power, but financing was a far bigger challenge," he said.

After an initial investment from E.F. Heizer, a venture capital firm, "it became apparent that it was almost certain no more money could be raised in the U.S.," Amdahl said.

"Fortunately, we could link up with Fujitsu, which offered $5 million and a joint technical program."

In October 1972, Nixdorf invested $6 million with the idea of forming a business relationship that never materialized. U.S. investors put in $7.8 million more and Fujitsu added $6.2 million.

In 1974, Heizer, Fujitsu and American General, a Texas insurance firm, put in $18.7 million.

"Our financing is now in adequate shape to carry us through our program," Eugene R. White, Amdahl president, said.

Fujitsu has three members on Amdahl's 11-member board and owns 20% of the company's common shares, he said.

While the 470/V6 shares logically similar architecture with the 370/168, a spokesman said Amdahl only uses IBM technology that is in the public domain and does not expect any trade secret problems.

Fujitsu is licensed to build the 470/V6 in Japan and will jointly market it with Amdahl in much of the world. The Japanese company also builds the CPU and memory subsystems for the U.S. machines.

GA, CA Extend Mini Offerings

(Continued from Page 34)

hooker, Methvin remarked. Then they came back and realized that was the entire product, he said.

Customers seem to be guarding against inventory buildup and are shipping systems out the door as fast as they receive them, he said.

GA Shipments Up

At GA, business is improved over where it was before the crunch, Lane said, and shipments this quarter will be above those of a year ago.

As the minicomputer makers delve further downward on the price curve, the definitions and distinctions between minicomputer and microcomputers are becoming more vague.

Lane said a microcomputer uses LSI technology and semiconductor memory, can be bought at the board level and is used in an application where it loses its identity. In a minicomputer, the user can add more memory and design his own I/O, he explained.

Methvin made the distinction on whether a unit was packaged. If it can be bought at the chip level, it is a micro; if it's packaged, it's a minicomputer, he said.

Although the microprocessor is seen by many as a threat, Methvin said micros are going to bring people who are afraid of computers, for either the price or reputed complexity, into the realm of computers.

After learning about micros, they may well find they need a bigger machine and then become minicomputer customers, he said.

If the micro suppliers get to the point where they are packaging their units and supplying software and support, then they'll be minicomputer companies, he said.

"There may be different names in the game, but the one constant is fierce competition," Methvin said, adding he doesn't see a semi house having any advantage over a minimaker in that area.

In Terminal Mart

Reception of 2644 Pleases HP

By Molly Upton
Of the CW Staff

CUPERTINO, Calif. – Reception of Hewlett-Packard Co.'s (HP) second entry in the terminal marketplace, the 2644, has been "better than expected," said Ed Hayes, marketing manager for the firm's new Data Terminal Division.

Ed Hayes

The terminal division intends to produce a terminal line that will complement the systems division and also expand its non-HP business, said Hayes.

He expects to announce at least two more terminals within the next year, he said.

The 2644 has a much larger OEM potential than the 2640, Hayes said. Currently about 70% of 2640 shipments are HP-related.

With the dual mini 3M Co. cartridge feature, OEMs can provide more added value in the form of software, he said.

HP expects to ship its 2,000th 2640 within a year of its announcement, he said. The big celebration at HP will be when Number 2640 goes out the door, Hayes said.

These HP 2644s are ready for shipment.

Currently HP has positioned its terminal products to cover about half of the terminal market, he said. The 2640 and 2644 cover the range of products with features such as block mode, edit and format and local mass storage and provide some of the features normally found only in user-programmable terminals, he said.

"We're still very new," he said, when asked why the range did not include user-programmable units.

However, the thrust of the division will be to provide units with increased speed and capability, he indicated.

In the future, HP may offer terminals with floppies, alternate character sets and APL, he said, as well as user-programmable units.

These higher performance features will be treated as new products, but he said he expects the older products to be able to incorporate many of these.

The floppy terminal should be announced soon, he said, but was a little more vague on the APL terminal. "We're taking a hard look at an APL terminal," Hayes said. Signs point to a possible announcement next spring.

On the 2640, HP came out with a forms-drawing option, but it began delivering orders initially without that capability as it had difficulty getting the read-only memories (ROM) for that feature. However, HP is now delivering the forms-drawing ROM, he said.

A year from now, Hayes said he expects orders to be running about 60% for the 2640-type of product and 40% for the 2644-type.

President Says

DG Expects Sales Growth in '76

NEW YORK – Data General Corp. (DG) expects next year to be a year of "somewhat stronger revenue growth" than this year was, President Edson D. De Castro said recently.

In reviewing a flat year of order activity, De Castro said part of the flatness stemmed from the firm's scrutiny of orders before they were accepted in efforts to reduce cancellations and accounts receivable.

"Much of the past year's strength has clearly come from acceptance of our larger systems – the Nova 840s, 830s, 2/10s and Eclipses," he said.

And this growing demand, which came from end users, more than offset the weakening OEM demand levels, De Castro said.

"As a result, a considerable volume of our current business is coming from end users for larger systems with full complements of peripheral equipment," he said.

Temporary Shift

"I believe, however, this shift in the mix of our business is temporary. The contribution of the OEM and systems house to the system's value is a significant and permanent part of this marketplace.

"And DG has hundreds of customers in this segment of the market that we intend to serve over the long range with products and services," he said.

"If our incoming orders are to be believed, the period of relatively flat order activity may be behind us. After about a year of little or no growth, order activity appears to be increasing with some consistency," De Castro said.

"This is largely a U.S. phenomenon and is resulting mostly from end-user activity, but there is some indication of OEM strength.

"Whatever marketplace and economic difficulties we have been through, they appear to be largely behind us.

"As an organization, we are in better control of our operations, and in product offerings we are in a far stronger position than we were a year ago," De Castro said.

Reducing Inventory

DG has been reducing inventory levels through automated inventory controls and material requirements planning, he said.

"It may be difficult to show further reductions as we prepare for increased output, but the actual value of inventories for the year should certainly be below that of a year ago," De Castro said.

The firm also introduced more stringent requirements for booking orders beginning last fall.

"These actions may have had a greater effect on keeping the incoming order rates flat than the marketplace itself," he said.

"Had we not aggressively cleaned out these shaky orders, we would have seen an increasing level" of accounts receivable and bad debts as well as orders, he said.

Data General's receivables are now running about 85 days, he said.

Manufacturing unit output has increased with a reduction in direct labor last fall, he said. The labor reduction has been in its Far East core stringing facility and in the closing of a facility in Canada, De Castro said.

The Westbrook, Maine, facility, has about 50 people now and "employment will increase as business conditions permit," he said.

DG revamped its field sales organization during the year, recruiting more qualified people, but keeping the number relatively constant, he said.

The firm has also been active in new market segments, specifically business DP, communications and point of sale (POS), he said.

Small Systems Demand Weak

"Frankly, the growth in demand for small computers has been weak in the past year, by historic standards. For DG, orders have been generally flat throughout most of the period.

"The only satisfaction we can take is that we correctly forecast revenue growth during this uncertain year. The economic slowdown clearly had an effect on overall demand levels in the OEM segment of our business, but end-user demand held up remarkably well," De Castro said.

"There are advantages in adversity, however. We have used the past 12 months to mature as a company and to establish ourselves in new segments of the market," he said.

The Eclipse market "appears to be developing slowly in a fashion similar to the original scientific market for the first minicomputers 15 years ago. I should point out, however, that acceptance of the C/300s has been quite strong so far and that we have won OEM as well as end-user orders for the system," De Castro said. The data communications area is "one of the fastest growing segments of our business and the need for new and advanced offerings has been strong," he said.

"Third, our POS supermarket system has reached a level of maturity where discussions with potential customers have become worthwhile. The system now includes fixed optical scanners of our own design," he said.

The firm is "beginning a controlled and high-level marketing effort," De Castro added.

"The application of scanning techniques itself is maturing slowly, however, and legal issues and consumer concerns may dictate a slow pace of application. As a result, we do not foresee significant revenue potential in 1976," he said.

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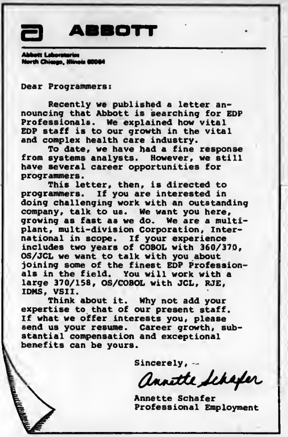

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Annette Schafer
Professional Employment

Data Processing

SYSTEMS ANALYST

FRONT-END PROJECT

Fluor Corporation is currently seeking an experienced data processing professional who thrives on challenge. The successful candidate will join our project team in developing a PDP based front-end system to interface Data General Terminals to a CDC CYBER computer and setting up remote sites for international applications.

Our candidate will have a minimum of 3-5 years experience working with PDP and assembly language. Applicant must additionally be familiar with real time applications and telecommunications software. Ability to work under pressure and interface well with associates is essential.

Fluor will be moving to its new facility in Orange County in the Fall of '76.

Qualified candidates interested in a solid future with a growing leader in the engineering/construction field, please submit resume with salary history to:

Pam Moore
FLUOR CORPORATION
2500 South Atlantic Blvd.
Los Angeles,
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COMMUNICATIONS PROGRAMMER

Expanding tech dept seeks professional with IBM compatible terminal software development exp in BI-SYNC line control & BTAM is desired. Position in New England. Salary to $22,000 (fee paid).

Contact: Stan Ourbas

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111 Pearl Street
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(203) 278-7170

SENIOR PROGRAMMER

Programmer/Analyst with a minimum of 5 years experience. ANS Cobol is a must. Some IBM and systems experience helpful. Permanent full time position with excellent salary and benefits.

Send resume in complete confidence to:

Personnel Supervisor
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39 Warren Avenue
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San Francisco

Systems Programmers & Data Supervisors

PACIFIC TELEPHONE is converting from OS/MVT with heavy TP environment to MP168 with MVS, IMS/VS, JES2, CICS/VS. We need systems programmers who have one or more years of recent IBM systems programming responsibilities in generation, modification, testing, debugging and maintenance — in the following areas:

OS/MVT or OS/VS2
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3705/TP-both EP's and related TP problems.

Salaries to 19K, depending on experience.

We also need Data Operation Supervisors who have recent experience with IBM 3rd generation computers, experience with OS/MVT and/or HASP, and experience with JCL and utility programs.

Candidates without recent direct responsibilities in the above areas should not apply.

Send detailed resume's to: Jeff Truxal, Department VW, 666 Folsom St., Room 646, San Francisco, Calif. 94017

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Research Associate
Systems Development
and
Assistant Professor-IEOR
at
Virginia Polytechnic Institute and State University

Responsibilities: The major responsibility for this position is to provide technical expertise and leadership in the areas of IMS/VS DB/DC system, and Mark IV. Emphasis is to be placed on design considerations and its impact on performance. Light teaching load in the department of IEOR.

Qualifications: Earned Doctorate Degree in Industrial Engineering or Operations Research. Thorough knowledge of IMS/VS DB/DC System and practical experience with Mark IV-particularly with its IMS interface.

Send resume before November 30, 1975 to:

Dr. Vinod Chachra
Director, Systems Development
113 Burruss Hall
VPI&SU
Blacksburg, Virginia 24060

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ACADEMIC USER SERVICES

The Clemson University Computer Center is seeking an individual to take part in the development of an academic user services program.

Applicants should possess a Master of Science degree in engineering or in a mathematical science and have extensive experience in the use of an IBM system at an OS/MVT level or above. A working knowledge of any of the more commonly used application packages in statistics, simulation, engineering, or numerical mathematics is also desirable.

Resumes should be submitted to:

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Clemson University
Computer Center
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We are a mid-sized corporation located in the southeast, and a new user of a dual configured B-6700 on-line with a multi-state terminal network.

We are looking for an individual with experience in managing the writing and maintenance and application of systems software for large-scale Burroughs computers.

You will be responsible for working with and directing a small staff with responsibility for the MCP, MCS, and Data-com, compilers and terminal software. Management ability is equally important to technical expertise. College graduate preferred.

Salary commensurate with experience. Submit resume in confidence to:

CW Box 4508
797 Washington St.
Newton, Mass. 02160

SENIOR SYSTEMS PROGRAMER

This position requires at least 5 years experience in telecommunications and network systems design and programming. Operating systems experience with VM highly desirable.

In this position, you will work with our corporate computing facilities and user management in projecting computing needs for on-line systems and also provide technical leadership in determining the hardware/software configuration of the computer center.

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- IBM 370/168 or 370/158.
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Interested candidates should forward resumes with salary history information to Charles Creteau or Tom Cibotti. All replies will be held in the strictest of confidence. Client company assumes all fees and expenses.

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Southern Illinois University at Carbondale

Southern Illinois University at Carbondale is a state-supported comprehensive institution with a current enrollment of approximately 21,000 students. It offers a full range of undergraduate and graduate programs including law and medicine. Master's programs are available in 58 fields and the doctorate (Ph.D.) in 20 fields. The Director of Computing Services plans and directs all computing activities for the university which includes the attainment of computing services, development of new systems, acquisition of hardware and software resources for maximization of production. Through various advisory committess, the Director maintains liaison with academic, research and administative users of the computing services. The Director organizes the computing resources to provide efficient and effective services. The Director of Computing Services reports directly to the president of the university.

Present Computing Center resources include a staff of 64 persons, an IBM 370/158 with VM control program and OS/MVT and a total budget of about $1,600,000. Remote job entry is provided to an IBM 1130, an IBM 3780, a Sanders 810 and 26 Decwriter and Hazeltine terminals.

Desirable qualifications include: A Ph.D. degree, prior university computing center experience and management experience at an assistant director or director level.

Applications should be received by December 1, 1975. Please write: President Warren W. Brandt, Anthony Hall, Southern Illinois University, Carbondale, Ill. 62901.

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SYSTEMS & PROGRAMMING

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Major Responsibilities: Administrative and technical direction of the CADPC facilities and resources; assistance to university and campus management in the assessment of needs and the establishment of priorities for computer based processing and information systems; coordination of university plans for acquisition and utilization of computer hardware, software services and personnel to support administrative needs; participation in the development of effective statewide plans for the use of computers in higher education.

Qualifications: A minimum of four years of highly responsible management experience in the data processing field with at least two years at a large institution of higher education; experience in hardware and software evaluation and selection; ability to develop, justify and manage large budgets; proven ability to successfully design, implement and operate major systems.

Education: A minimum of a baccalaureate in a related field or equivalent experience.

Facilities: The CADPC, through its staff of approximately 45 people and its system 370 model 145, supplies administrative data processing services to the 30,000 students, staff and faculty of the four campuses of the University of Colorado. The CADPC is located in Boulder, a city with a population of 80,000.

A letter of application and supporting resume should be submitted no later than December 15, 1975. These documents must clearly demonstrate how the applicant's experience and training correspond to the job qualifications.

Please direct all material to:

Chairperson
Search Committee for the Director
of Administrative Data Processing
Regent Administrative Center 303
University of Colorado
Boulder, Colorado 80309

All applications will be kept strictly confidential.

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Please send resume to: K.P. Lyman, Personnel Supervisor, GTE Laboratories Inc., 40 Sylvan Road, Waltham, Mass. 02154.

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Sanders Turns Profit for '75; Founder Bids Farewell

By Ronald A. Frank
Of the CW Staff

NASHUA, N.H. – Royden C. Sanders bid a somber and final farewell to the company he founded and once led at the annual meeting of Sanders Associates, Inc. recently.

Much of the meeting was taken up with reserved though often bitter comments between Harold W. Pope, president, and Sanders, who resigned from the firm last February after what Sanders said was a "coup" designed to oust him.

Pope explained the principal reason for Sanders' exit was that he would not take action to reduce the losses from the data systems group and was "unwilling to listen to other directors."

On the financial side, Pope reported earnings for fiscal 1975 of $15 million or $3.27 a share compared with a loss last year of $19 million or $4.17 a share.

The profit was made up of $1.5 million income before taxes and $13.4 million in extraordinary credits.

The credits included an exchange of new 12% convertible debentures for earlier outstanding 5% convertible debentures and an operating loss carried forward of $10 million for "financial statement purposes."

SDS Suffers Loss

Sanders Data Systems (SDS) suffered a loss of $9.3 million compared with a loss of $15.8 million in the previous year.

Sales for the period were $25.3 million which compared with $18.7 million in 1974. Pope said SDS was "still a serious problem area, but the company is continuing a serious effort to make it profitable."

The steps being taken to achieve this goal include first shipments of the 8170 series of CRTs which are compatible with the IBM 3270 series. In addition, SDS reduced its expenses and ended the year with the 20% less manpower, Pope reported.

Arthur Carroll, group vice-president in charge of SDS, reported an effort during the year to reduce leased systems in favor of purchases.

Pope revealed the firm had unsuccessfully sought joint-venture marketing and service arrangements to improve the bottom line of the data systems group.

M. Joel Kosheff, vice-president of finance, said he doesn't anticipate the group will be profitable this year, but "it is possible we could be in the black" next year.

John A. Ruggiero, treasurer, told the *Wall Street Journal* one goal is to get the data systems group's volume up to the $40 million to $45 million break-even level as quickly as possible. The projected volume for this year should be $30 million to $35 million, he said.

The Sanders legal suit against IBM is proceeding well, according to attorney Joseph Millimett. The suit is currently in the pretrial discovery phase.

In turn, IBM has 18 persons in Nashua, examining Sanders documents.

The pretrial phase will last 12 to 18 more months, Millimett predicted. He commented he feels confident the case will come to trial in U.S. District Court in New Hampshire.

Working for Memorex

Sanders revealed he has been a paid consultant of Memorex Corp., working on a word-processing product, since his Sanders' salary terminated May 31.

Kosheff said the firm was "unable to negotiate a consulting contract" with Sanders that included a noncompetition agreement and therefore cut off his salary.

Motions by Sanders to delete his name from the corporate name and to limit the age of the board of directors [CW, Oct. 8] were defeated.

The most heated exchange between Sanders and Pope occurred during discussion of a motion by Sanders to limit to $100,000 fees paid to foreign agents.

Pope ruled the item out of order. Sanders claimed the company had already paid $40 million to outside agents to get contracts with the governments of Nigeria and Saudi Arabia.

Pope denied the payments but said the company was negotiating for contracts based on an expanding interest in equipment by the Opec countries.

"We will pursue profitable business ventures, but if Sanders or anyone else believes we are engaged in improper business practices, they are misinformed," Pope said.

All current directors with the exception of Sanders were reelected. This marked the first time in the 24-year history of the company that Sanders was not involved in its management.

NCR Earnings Dip 20% in Third Quarter

DAYTON, Ohio – NCR Corp.'s earnings dropped 20% in the third quarter and were 6% in the nine months below those of the comparable year-ago periods, although revenues in each period rose.

Earnings for the quarter fell to $15.9 million or 66 cents a share compared with $19.9 million or 81 cents a share last year.

Revenues for the period reached a new high of $521.6 million, compared with $488.1 million in the same period last year.

For the nine months, earnings declined to $48.6 million or $2.01 a share compared with $51.8 million or $2.19 a share in the same year-ago period.

Revenues rose 12% to $1.5 billion compared with $1.35 billion last year.

Data terminals and computer systems contributed to revenue growth but free-standing business machines showed a substantial decline, the firm said.

"Profits continue to be adversely affected by reductions in manufacturing schedules carried out earlier this year to reduce inventory levels. This factor, plus NCR's conversion to electronic production, has resulted in excess manufacturing capacity and higher fixed costs charged to operations," according to William S. Anderson, chairman and president.

Incoming business is running approximately even with last year, he said. Many customers, especially in the retailing industry, have postponed systems changes and expansion programs in the face of economic uncertainties.

In addition, confusion about possible legal restrictions on electronic funds transfer systems and proposed restrictive legislation pertaining to supermarket scanning systems are having a negative impact on orders and shipments, he said.

Earnings have also been affected by a substantial falloff in the revenues and earnings of the Appleton Papers Division because of currency exchange fluctuations and higher R&D expenditures, Anderson said.

NCR has carried out a number of cost-saving programs to help offset the impact of the recession, including inventory and personnel reductions. The company has also announced plans to close two small overseas plants and to consolidate manufacturing operations at a number of larger facilities in order to balance manufacturing capacity with the reduced space requirements of electronic production.

Additional economies and further improvements in productivity are anticipated as a result of a comprehensive review being undertaken of all current operations, Anderson observed.

"We are assuming that 1976 will be as demanding as 1975 and are planning accordingly.

"From a longer term standpoint, we foresee a stronger and more stable world economy and a resumption of the above-average growth which our industry has experienced during the past 30 years," he said.

Net Up Almost 10% in Sperry Rand Half

NEW YORK – A 12% gain in revenue from commercial computers in the six months helped Sperry Rand Corp. report increases in revenues and earnings for the second quarter and six months compared with the same periods last year.

Earnings for the second quarter rose 9.7% to $31.4 million or 91 cents a share compared with $28.6 million or 83 cents a share in the same period last year.

Revenues for the quarter rose 5% to $758.1 million compared with $721.9 million in the year-ago quarter.

During the six months, earnings rose 9.8% to $60.5 million or $1.75 a share compared with $55.1 million or $1.60 a share in the same period last year.

Revenues for the half were up 6.8% to $1.5 million compared with $1.4 million a year ago.

"Sperry earnings and revenue progress continued for the 14th consecutive quarter while the overall business climate remained mixed," J. Paul Lyet, chairman and chief executive officer, said.

"New orders for Sperry Univac computer products have held up well in view of cutbacks in the capital spending plans of many commercial customers," Lyet said.

"Orders, which were very strong in the April-June quarter, slowed in this quarter and were up 10% through the first six months of fiscal 1976."

A medium-priced system in the Univac large-scale 1100 series, introduced Oct. 1, is expected to have a "positive impact on orders in the second half of the year," he said.

The corporation's cost-control program contributed significantly to the improvement in pretax profit margin, and its asset management program resulted in reduced inventory and receivable levels, Lyet said.

"Overall," he concluded, "we continue to see progress despite unstable economic conditions around the world."

Earnings Reports

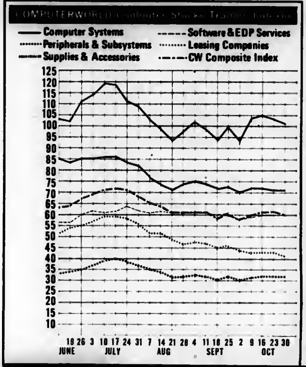
XEROX
Three Months Ended Sept. 30

	1975 (000)	a1974 (000)
Shr Ernd	$1.01	$1.03
Revenue	1,025,420	889,953
dDisc Op	.....	(6,175)
Earnings	79,935	81,585
9 Mo Shr	2.10	3.12
Revenue	2,997,932	2,541,402
dDisc Op	b(97,325)	(14,947)
Earnings	166,598	247,341

a-Restated to reflect discontinued operations and an accounting change. b-Includes estimated $84.8 million loss on disposition of discontinued operations. d-Subsequent to June 30, 1975, operating loss related to discontinued operations charged to the reserve for disposition of such operations.

DATAPOINT
Year Ended July 31

	1975	1974
Shr Ernd	$2.11	$1.88
Revenue	46,890,000	34,063,000
Tax Cred	1,473,000	1,051,000
Earnings	4,567,000	3,401,000
3 Mo Shr	.63	.45
Revenue	13,690,000	9,103,000
Tax Cred	498,000	226,000
Earnings	1,477,000	939,000



DPF
Three Months Ended Aug. 31

	1975	a1974
Shr Ernd	$.03	$.13
Revenue	5,686,000	7,147,000
Spec Cred	b28,000	d449,000
Earnings	116,000	538,000

a-Restated. b-From tax-loss carryforward. d-Consists of $206,000 gain on repurchase of debentures and $243,000 from tax-loss carryforward.

HONEYWELL
Three Months Ended Sept. 30

	1975 (000)	a1974 (000)
Shr Ernd	$.75	$.59
Revenue	669,969	621,233
Spec Item	(264)	28
Earnings	14,769	11,443
9 Mo Shr	1.67	2.50
Revenue	1,959,391	1,865,364
Spec Cred	926	95
Earnings	32,660	48,104

a-Restated to reflect accounting change.

RAPIDATA
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	$.20	$.09
Revenue	3,775,090	2,933,508
Earnings	354,087	157,740
9 Mo Shr	.53	.18
Revenue	11,032,838	8,384,389
Earnings	965,012	329,647

BOLT BERANEK & NEWMAN
Three Months Ended Sept. 30

	1975	1974
Shr Ernd	.....	$.46
Revenue	$7,460,200	8,447,800
aEarnings	(112,100)	b566,200

a-Includes charges of $276,000 in 1975 and $96,500 in 1974 from startup costs of Telenet Communications Corp., an affiliate. b-Includes $308,300 gain from exchange of nonexclusive license.

DATA CARD
Three Months Ended Sept. 27

	a1975	b1974
Shr Ernd	$.21	$.15
Revenue	3,880,000	2,075,000
Earnings	319,000	221,000
6 Mo Shr	.38	.32
Revenue	7,044,000	4,039,000
Earnings	582,000	472,000

a-Included operations of Troy Division acquired in May 1975. b-Restated to reflect an accounting change.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 29, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		PRICE 1975 RANGE (1)	PRICE CLOSE OCT 29 1975	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	85 3/8	-2 1/2	-2.8
O	COMPUTER AUTOMATION	2- 10	9 1/4	-1 1/8	-10.8
N	CONTROL DATA CORP	11- 23	18 1/4	-1 1/8	-5.8
N	DATA GENERAL CORP	10- 38	35 7/8	-1 1/2	-4.0
O	DATAPOINT CORP	6- 26	22 1/2	-1 1/2	-6.2
O	DIGITAL COMP CONTROL	1- 4	2 3/4	0	0.0
N	DIGITAL EQUIPMENT	46-135	128 1/4	-1 1/8	-0.8
N	ELECTRONIC ASSOC.	2- 3	2 1/8	+ 3/8	+21.4
A	ELECTRONIC ENGINEER.	5- 10	8 3/4	+ 1/8	+1.4
N	FOXBORO	23- 42	27 1/2	- 1/8	-0.4
O	GENERAL AUTOMATION	4- 14	5 1/4	+1 1/8	+27.2
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	58-120	101 3/4	+ 1/2	+0.4
N	HONEYWELL INC	22- 40	33 5/8	- 1/2	-1.4
N	IBM	153-224	211	-2 1/4	-1.0
O	MEMOREX	1- 13	8 1/8	- 3/4	-8.4
O	MICRODATA CORP	2- 6	5 3/4	0	0.0
O	MODULAR COMPUTER SYS	5- 19	9 1/4	-1	-9.7
N	NCR	15- 39	24	-1 3/8	-5.4
O	PRIME COMPUTER INC	2- 6	4 3/4	- 1/4	-5.0
M	PERKIN-ELMER	16- 33	25 7/8	- 3/4	-2.8
N	RAYTHEON CO	26- 59	52 1/2	-2 1/2	-4.5
N	SINGER COMPANY	10- 17	9 1/2	-2 3/8	-20.0
N	SPERRY RAND	26- 49	42 7/8	0	0.0
A	SYSTEMS ENG. LABS	1- 5	2 7/8	0	0.0
N	VARIAN ASSOCIATES	7- 18	14	-1 3/8	-8.9
N	WANG LABS.	7- 17	10 7/8	- 3/8	-3.3
N	XEROX CORP	51- 86	56 7/8	-1 3/4	-2.9
	LEASING COMPANIES				
O	COMDISCO INC	1- 5	2 5/8	+ 1/8	+8.3
A	COMMERCE GROUP CORP	2- 4	2 5/8	+ 1/8	+5.0
A	COMPUTER INVSTRS GRP	1- 2	5/8	-	-9.1
M	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	3- 6	4 5/8	+ 1/8	+2.7
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/8	0	0.0
A	GREYHOUND COMPUTER	2- 3	2 1/2	0	0.0
A	ITEL	3- 9	6 3/8	- 1/2	-7.2
N	LEASCO CORP	4- 8	6 5/8	- 3/8	-5.3
O	LEASPAC CORP	1- 1	1/8	- 1/8	-50.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	MPS INC	0- 4	1/2	0	0.0
A	PIONEER TEX CORP	2- 7	5 7/8	- 3/4	-11.3
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
M	U.S. LEASING	7- 14	8 1/8	- 1/4	-2.9
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 1	1 1/8	+ 1/4	+28.5
A	APPLIED DATA RES.	1- 10	1 1/2	0	0.0
N	AUTOMATIC DATA PROC	29- 65	57	-2 7/8	-4.8
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	CENTRAL DATA SYSTEMS	3- 7	7 3/8	0	0.0
O	COMPUTER DIMENSIONS	2- 6	3	0	0.0
O	COMP ELECTION SYSTMS	3- 7	6 1/4	- 1/2	-7.4
O	COMPUTER HORIZONS	1- 1	3/4	0	0.0
O	COMPUTER NETWORK	1- 3	3 1/8	0	0.0
N	COMPUTER SCIENCES	2- 6	4 1/2	- 1/2	-10.0
O	COMPUTER TASK GROUP	1- 1	5/8	0	0.0
O	COMPUTER USAGE	2- 4	2 1/8	0	0.0
O	COMSHARE	3- 4	2 5/8	0	0.0
O	DATATAB	1- 2	1	+ 1/8	+14.2
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	12- 29	15 1/4	+ 3/8	+2.5
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	2- 3	2 1/4	- 1/8	-5.2
O	KEYDATA CORP	2- 3	2	0	0.0
O	LOGICON	3- 8	3 1/2	0	0.0
A	MANAGEMENT DATA	1- 3	1 3/4	0	0.0
O	NATIONAL CSS INC	6- 14	10 7/8	- 5/8	-5.4
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 17	12 7/8	+ 5/8	+5.1
N	PLANNING RESEARCH	2- 6	3 3/8	- 1/4	-6.8
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	3	- 5/8	-17.2
O	REYNOLDS & REYNOLDS	10- 24	15 1/2	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1 1/8	0	0.0
O	TYMSHARE INC	7- 21	19 5/8	+ 1/2	+2.6
A	UPS SYSTEMS	2- 4	3 1/4	+ 1/4	+8.3
N	WYLY CORP	2- 4	3	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 9	8 1/8	0	0.0
O	ADVANCED MEMORY SYS	1- 7	5 5/8	+ 1/8	+2.2
N	AMPEX CORP	3- 7	5 5/8	+ 1/8	+2.2
O	ANDERSON JACOBSON	1- 3	2	0	0.0
O	ARCHIVE MEDICAL ELEC	1- 5	3 1/4	- 1/4	-7.1
A	BOLT,BERANEK & NEW	5- 13	6 1/2	-2 1/2	-27.7
N	BUNKER-RAMO	4- 8	4 5/8	- 1/8	-2.6
A	CALCOMP	4- 7	3 5/8	- 5/8	-14.7
O	CAMBRIDGE MEMORIES	2- 5	2 3/8	- 1/4	-9.5
N	CENTRONICS DATA COMP	7- 25	18 3/8	+ 1/2	+2.7
O	CODEX CORP	15- 38	34 3/4	- 3/4	-2.1
O	COGNITRONICS	1- 2	7/8	+ 1/8	+16.6
O	COMPUTER COMMUN.	1- 2	3/4	+ 1/8	+20.0
O	COMPUTER CONSOLES	3- 7	4 1/4	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 3/4	+ 1/8	+7.6
O	COMPUTER MACHINERY	1- 2	1	0	0.0
O	COMPUTER TRANSCEIVER	1- 2	1	+ 1/8	+14.2
O	CONTEN	2- 5	3 1/2	- 1/8	-3.4
N	CONRAC CORP	12- 26	24 5/8	- 7/8	-3.4
O	DATA ACCESS SYSTEMS	1- 3	1 1/4	0	0.0
O	DATA 100	5- 16	9 3/4	- 3/8	-3.7
B	DATA PRODUCTS CORP	2- 5	4	+ 1/8	+3.2
O	DATA TECHNOLOGY	1- 3	1 3/8	- 1/8	-8.3
O	DATUM INC	1- 2	7/8	0	0.0
O	DECISION DATA COMPUT	3- 7	3 3/8	- 1/4	-6.8
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DI/AN CONTROLS	1- 1	3/4	0	0.0
N	ELECTRONIC M & M	1- 3	1 3/8	- 1/4	-15.3
O	FABRI-TEK	1- 1	3/4	- 1/8	-14.2
O	GENERAL COMPUTER SYS	1- 2	1 1/4	+ 1/4	+25.0
N	HAZELTINE CORP	3- 6	3 5/8	+ 1/8	+3.5
N	HARRIS CORP	18- 30	30 1/8	+1 7/8	+6.4
A	INCOTERM CORP	3- 12	9 5/8	+ 3/8	+4.0
O	INFOREX INC	2- 5	2 5/8	- 1/8	-4.5
O	INFORMATION INTL INC	8- 14	12 3/4	- 3/4	-5.5
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
B	MILGO ELECTRONICS	8- 24	15 1/4	-1	-6.1
N	MOHAWK DATA SCI	1- 5	3 1/8	0	0.0
O	OPTICAL SCANNING	1- 3	2 5/8	0	0.0
O	PENRIL CORP	2- 2	1 1/4	0	0.0
O	PERTEC CORP	2- 5	4 3/4	+ 1/4	+5.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1/4	0	0.0
O	QUANTOR CORP	2- 6	3 3/8	- 3/8	-10.0
O	RECOGNITION EQUIP	2- 9	6 1/8	- 3/8	-5.7
N	SANDERS ASSOCIATES	3- 11	8 1/8	+ 5/8	+8.3
O	SCAN DATA	1- 3	1 1/2	- 1/8	-7.6
O	STORAGE TECHNOLOGY	4- 17	12 1/8	-1 3/8	-13.1
O	SYCOR INC	5- 17	16	- 1/4	-1.5
O	T BAR INC	3- 6	6	0	0.0
O	TALLY CORP.	1- 5	3	- 1/8	-4.0
O	TEC INC	1- 4	2 3/4	- 1/4	-8.3
N	TEKTRONIX INC	18- 43	41 1/2	+ 1/2	+1.2
N	TELEX	1- 3	2	0	0.0
O	WANGCO INC	4- 9	7	+ 1/8	+1.8
O	WILTEK INC	1- 4	2 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 5	4 1/2	0	0.0
A	BARRY WRIGHT	5- 7	5 1/2	+ 1/8	+2.3
O	CYBERMATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	31	0	0.0
O	DUPLEX PRODUCTS INC	12- 25	15 3/4	+ 1/2	+3.2
N	ENNIS BUS. FORMS	5- 7	4 3/4	- 1/8	-2.5
O	GRAHAM MAGNETICS	5- 10	8 1/4	- 1/4	-2.9
O	GRAPHIC CONTROLS	8- 21	12 3/4	- 1/2	-3.7
N	3M COMPANY	43- 68	57 1/8	-2 1/8	-3.5
O	MOORE CORP LTD	39- 51	44 1/2	0	0.0
N	NASHUA CORP	9- 22	10 3/4	+1	+13.2
O	STANDARD REGISTER	11- 20	15 3/4	- 1/4	-1.5
O	TAB PRODUCTS CO	4- 8	5	0	0.0
N	UARCO	17- 24	18 1/2	- 1/2	-2.6
O	VANIER GRAPHICS CORP	4- 7	4 1/2	0	0.0
A	WABASH MAGNETICS	4- 5	4	- 1/8	-3.0
N	WALLACE BUS FORMS	15- 25	16	- 5/8	-3.7

EXCH: N=NEW YORK; A=AMERICAN; B=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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